There are also 60 hours of practical work and visits. In addition to the usual round of waterworks, sewage farms, and slaughter-houses, there are interesting exercises in recording the follow-up and isolation of patients with communicable diseases and the detection of foci of infection. Students also spend one whole day in a “sanepid” station.

There is an examination in hygiene subjects at the end of the second semester of the fifth year.

Postgraduate education

Postgraduate training in all medical subjects, including hygiene and public health, is regulated by law. It is organized by the Institute for Postgraduate Training of Physicians in Budapest, founded in 1956.

Within this Institute there are four departments concerned with hygiene and public health: the Department of Hygiene and Epidemiology, the Department of Food Hygiene, the Department of Industrial Hygiene, and the Department of Public Health Organization. These departments have their training centres in the State Research Institute of Hygiene, the Institute of Nutrition, and the Institute of Industrial Hygiene. In this way very close collaboration between research, education, and practice is achieved.

The training covers specialization, preparation for higher degrees (Candidate of Medical Sciences and Doctor of Medical Sciences), and short refresher courses.

In the public health field, physicians can specialize either in the work of public health laboratories and epidemiology or in hygiene. Specialization in the former subject is open to physicians who have already qualified as specialists in medical laboratory investigation and have carried out at least two years’ practice in a laboratory for public health and epidemiology.

The specialization course in hygiene lasts four years, and mainly takes the form of in-service training in “sanepid” stations, at the State Institute of Hygiene, or at the Institute of Public Health of the University Medical School. In the fourth year the candidate must attend a six-month course (four months of lectures and two months of practical work) at one of these two Institutes. In general the training is highly technical, and expertise in administration has to be obtained during practice as a specialist and by attendance at short courses.

The training of industrial physicians is regarded as very important and takes the form of two-month concentrated courses of 330 working hours. Table 13 shows the general programme.

A feature of Hungarian postgraduate training in hygiene and public health is the large number of short courses and seminars, usually relating to a narrow specialty such as soil hygiene, drinking water and sewage disposal (2 weeks), atmospheric dust measurements (1 week), microbiology of
foodstuffs (4 weeks), communal hygiene (2 weeks), organization of health services (for public health physicians at various levels, 2 and 4 weeks).

Short courses of lectures, usually taking three full days at intervals of 1–2 weeks to facilitate attendance by busy physicians, are given on various subjects. Representative titles are ”Prevention of perinatal infant mortality” and ”Prevention of occupational skin diseases”.

These seminars and lecture courses usually end with free discussion, at which the participants give their comments and make suggestions concerning the content and method of the course.

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**ICELAND**

Population (1965) 194 000

The responsibility for health matters rests with the Ministry of the Interior. Within the Ministry is a Directorate of Health. Outside Reykjavík the country is divided into 55 districts served by district public health officers. In the rural areas the district public health officers undertake all types of medical work, including both medical care and public health. They work with the local boards of health, of which they are usually members. A board of health is responsible for all health matters in its district.

Most hospitals are run by the local authorities, but the State is responsible for the general hospital in Reykjavík, which serves as a general teaching hospital, and for some special hospitals.
The school health services are also under the Directorate of Health. In rural areas the district public health officers act as school physicians, but in Reykjavik there are a few doctors for school health and other public health work.

There is a social insurance scheme that covers the entire population and meets the cost of most medical care.

Undergraduate medical studies

The medical school is a faculty of the State University of Iceland, which is under the supervision of the Ministry of Education. Each faculty has its Faculty Council, composed of the full-time professors, which elects the Dean for one year from among its own members. The deans are ex officio members of the Consistorium, which is responsible for the administration of the University.

Conditions of admission and duration of study

Entrance to the Faculty of Medicine is open to all students who have obtained the secondary school certificate from a recognized school. The Faculty has the power to restrict admission if it deems this necessary.

The course lasts seven years and is divided into three parts. Part I occupies the first three years, and covers basic sciences, anatomy, physiology, and biochemistry. Part II, which occupies the fourth and fifth years, covers pathology, bacteriology, pharmacology, and an introduction to clinical work in hospitals. Part III, comprising the sixth and seventh years, covers the clinical subjects, hygiene, and forensic medicine. Examinations are held at the end of each of the three parts, and an examination in chemistry is taken at the end of the first year. The examination in clinical medicine and surgery is written, oral, and clinical. Examinations in other subjects are oral.

Successful candidates receive the degree of Candidatus Medicinae et Chirurgiae. Before receiving the licence to practise (ius practicandi) the graduate must complete one year’s “rotating” internship at a recognized hospital and serve as an assistant or locum tenens to a district doctor for three months.

Teaching of public health

Hygiene is taught for two years during Part III of the medical course. Altogether about 90 lectures are given, covering: epidemiology and contagious diseases, environmental sanitation, industrial hygiene, health protection at different ages (mothers, infants, schoolchildren, etc.), nutrition and food
sanitation, vital statistics, and so on. In addition there is a practical
course of about 10 hours (laboratory methods, demonstrations) for which
the students are divided into small teams.

Considerable weight is also given to preventive medicine in the teaching
of clinical subjects, especially medicine.

There is no Chair of social medicine, but problems relating to social
medicine are to some extent dealt with in the teaching of such topics as
hygiene, forensic medicine, and psychiatry.

On the whole the students, who come from all income levels, have no
difficulty in obtaining an insight into the social environment of the patients.
It is felt that they learn more of some aspects of social medicine from their
customary work as assistants to district physicians during the summer
vacations, as well as from the three months of compulsory postgraduate
service, than they would from a series of lectures.

IRELAND
Population (1961) 2,818,341

The Minister of Health is responsible for the health services. His
responsibilities include supervision of the services provided by the local
health authorities, the provision and administration of finances to meet
part of the cost of building and maintaining hospitals, sanatoria, dis-

censaries, etc., and the operation of the services.

The local health authorities are generally the county councils, but in
some areas larger joint authorities have been established for the specific
purpose of administering the health services. All these local authorities
have managers to perform executive functions, and a chief medical officer
responsible for the co-ordination and direction of public health services,
including preventive services.

Ireland has a general medical service, which is provided by the local
health authorities and based on some 600 dispensary districts, and a hospital
and specialist service, which is provided in institutions run by the local
health authorities or other approved bodies. These services are provided
free to persons in the lower income group, about 30% of the population.
A further 60% of the population, generally known as the middle income
group (which includes persons insured under the Social Welfare Code), are
entitled to use the hospital and specialist service at little or no cost.
Maternity services are available free for the lower and middle income
groups. For tuberculosis and other specified infectious diseases, a free
protection, diagnostic, and treatment service is available to all, irrespective of income. Housing and sanitation services are the responsibility of county council departments, under the over-all supervision of the national Department of Local Government. Occupational health is the responsibility of the Ministry of Labour, but the General Register Office for births, deaths, and marriages is attached to the Ministry of Health.

Undergraduate medical studies

There are five medical schools in Ireland. One (the Royal College of Surgeons in Ireland) is autonomous and the other four are university faculties, including three that belong to constituent colleges of the National University of Ireland. All schools have complete freedom in the organization of studies, although the broad outlines of "the course of study required for qualification to practise and the right to practise medicine are controlled by law, viz, the Medical Act 1956, the Medical Practitioners Acts 1927-1961.".

Conditions of admission and duration of study

Intending students must pass the appropriate entrance examination or its equivalent, and present a certificate of good character and in some cases a certificate of good physical and mental health. The limitation of facilities has caused each school to adopt a selection process.

Medical studies last six years, and comprise a pre-medical (sciences) course of one year, a pre-clinical course of two years, and a clinical course of three years. The last term of the second pre-clinical year acts as a bridge between pre-clinical and clinical subjects. One year's service as resident house officer in an approved hospital is required before full registration and licence to practise are granted.

Teaching of public health

Teaching in the different schools varies somewhat in content and method, but is basically the same. The course at University College, Dublin, is given as an example.

Public health teaching is spread over the second, third, fourth and sixth years of study, but is mainly given in the last term of the second year and the first two terms of the third year. Besides some 70 formal lectures there are combined clinico-social case conferences, weekly for two terms, and a number of optional visits.

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1 University College, Dublin (1965) Faculty of Medicine—regulations for courses of study, Dublin, Browne & Nolan, p. 327.
The subjects covered include:
The influence on health of the social and physical environment, with special emphasis on
the quality of health and medical care services
Family relationships
Occupation and socio-economic circumstances; the role of the doctor in industry;
rehabilitation
Epidemiology and statistics: indices of health, interpretation of statistical and graphic
data, sources and collection of data, special epidemiology, e.g., heart disease, cancer,
tuberculosis
Health and welfare legislation and administration; development and structure of Ireland’s
health services
International health organizations
The control of communicable diseases
Social and preventive psychiatry: incidence and importance to the community of different
types of mental illness; alcoholism
Community services for vulnerable groups: mothers and infants, child welfare and school
health services, services for physically and mentally handicapped children and children
in need of care
Influence of heredity on health
Health education of the public
Nutrition: dietary surveys, malnutrition as a world problem, use of protein supplements
Environmental sanitation: water supplies and sewerage systems, water-borne and food-
borne diseases, zoonoses, atmospheric pollution, radiation hazards.

The combined case conferences are conducted jointly by members of the
Department of Medicine and the Department of Social and Preventive
Medicine. The hospital social worker may also attend. The patient’s
illness is discussed in the light of his life in the community and his social
relationships.

The optional visits are to such institutions as child welfare clinics,
schools for physically and for sensorially handicapped children, rehabilitation
centres, etc. These visits are made by groups of 10–30 students, accompanied
by a lecturer from the appropriate department, and discussions are held
with the medical and other staff of the institutions visited.

During the period of clinical clerkship in the fourth year, each student
attends three special “tutorials”. The discussions are led by the lecturer
in social and preventive medicine and the hospital social worker, and
sometimes another clinician such as a psychiatrist will take part. The
discussion covers the social background of the patient, the role of the general
practitioner, care after discharge from hospital, prevention of recurrence,
the use of services available to help the patient, etc. The students take an
active part in the discussions and prepare material concerning the case
under consideration.

Finally, during one term of the fifth year, the Professor of Social and
Preventive Medicine gives a series of weekly lectures on the influence of
environment on disease.
Epidemiology and control of communicable diseases, and theoretical and practical aspects of immunology, are taught during the second and third years. Special emphasis is laid on the investigation of diseases caused by micro-organisms, and methods of controlling them.

In general, the major emphasis throughout the course is placed on social and community aspects of health and disease; less importance is attached to instruction in hygiene and environmental sanitation.

A written and oral examination is held at the end of the third year, and the paper on medicine in the final examination includes one question on preventive and social medicine.

At Trinity College Medical School there are separate Chairs of Social Medicine and Preventive Medicine, and close co-operation has been established with the heads of other departments in an attempt to bring the student into contact with aspects of social and preventive medicine at as many points of the medical course as possible. The Professor of Microbiology also occupies the Chair of Preventive Medicine, and deals with the control of infectious diseases; consequently, it is not necessary to deal with this in the Department of Social Medicine. The emphasis is again on the social and community aspects of disease, and about 20 classes are held each year in hospitals; suitable clinical material is used, and additional information is provided by social workers. Students visit the homes of some of the patients and prepare reports for class discussion.

Postgraduate education

At present the only course leading to an academic postgraduate diploma in public health is given at University College, Dublin. Physicians only are eligible for the course, which involves full-time study for one academic year, and cannot be accepted until they have been fully registered for at least two years.

The curriculum comprises:

1. Systematic instruction in public health, epidemiology, hygiene and sanitation
2. Clinical instruction in infectious diseases
3. Practical instruction:
   
   (a) practical demonstrations of problems illustrating the subjects dealt with in systematic instruction;
   
   (b) exercises in solving epidemiological problems and in preparing memoranda containing statistical data;
   
   (c) visits to places and institutions of importance to public health.
The systematic course of instruction is as follows:

**Law, social welfare, and public health practice (26 hours)**

The history of public health and social welfare; the evolution of central and local authorities; the evolution of law in relation to public health administration.
The existing functions of central and local authorities and voluntary organizations, and
the nature and objects of the public health and medical services they administer;
agencies for the relief of poverty and the promotion of social welfare.
The law relating to public health administration; organization and management of medical
departments and institutions.
Hospital services, services for the deaf.

**Environmental hygiene (24 hours)**

Sanitation, water supplies, housing, town and country planning, and the application of
scientific principles to these matters.
The influence on physical and mental health of the environment, including housing and
occupation, economic circumstances, nutrition, and personal hygiene.
Radiation medicine.

**The influence of heredity on health (6 hours)**

**Physiology, biochemistry, food and nutrition in relation to public health (12 hours)**

**Epidemiology (55 hours)**

Microbiology, parasitology, and medical entomology as applied to epidemiology.
Community aspects of disease; administrative measures in relation to communicable and
other diseases.

**Statistics (32 hours)**

The nature and sources of information bearing on the health of the people, and the
statistical analysis and numerical presentation of such data; the preparation of memo-
randa and scientific articles containing statistical data.

**Mental health (6 hours)**

The mental health services; social consequences of mental illness; mental deficiency.

**Health education (4 hours)**

Methods of educating the public in the promotion and maintenance of health.

**After-care and rehabilitation (2 hours)**

**International health organizations (5 hours)**

**Industrial medicine and psychology (24 hours)**

**Sociology and social ethics (8 hours)**

The examination at the end of the course includes written and oral tests
in the subjects on the curriculum. In addition, each candidate must
present:

1. A day-book in which he has made regular entries on subjects in
which practical instruction is given during the course, brief observations on
the objects of that instruction, and the conclusions drawn;

2. A dissertation on a subject approved by the University;
(3) Evidence that he has attended at the health department of a local authority approved by the University for not less than five months, and that he has observed and studied the daily work of each section under appropriate guidance.

Other diplomas

The Faculty of Medicine at University College, Dublin, also offers a four-week course leading to a Diploma in Child Health. Instruction is given in all aspects of paediatrics, including child welfare, school medical services, neonatal diseases, infectious diseases, child psychiatry, social paediatrics, and diabetics.

Research

A steady volume of research related to public and social medicine is carried out, but this is more concerned with the technical, quasi-clinical and epidemiological aspects. For instance, a special study is being made at Trinity College in collaboration with American workers: Irishmen who have been living in Boston for 15–20 years are being compared with their brothers still in Ireland, where mortality from coronary heart disease is about one-third of the Boston figure. A study of the utilization of in-patient accommodation in the Dublin hospitals has been carried out jointly by members of the Departments of Social Medicine and Social Studies, Trinity College, and the Department of Social and Preventive Medicine, University College. A special section of their recently published report deals with patients over 65 years. Otherwise, operational research and research into aspects of public health practice have as yet received little consideration.

ITALY

Population (1960) 50 707 816

A Ministry of Health was established in 1958, and includes the following general directorates: public health, hospitals, social medicine, nutrition and food hygiene, pharmaceutical services, veterinary services, and personnel administration. The National Council of Health acts as a consultative organ to the Ministry, which is required by law to seek the Council’s advice on certain predetermined matters; other questions on which special advice is required are also submitted to the Council.

The National Institute of Health (Istituto Superiore di Sanità) is the technical arm of the Ministry, and carries out controls and research at national level.

The country is divided into 92 provinces, each supervised by a Prefect. The Ministry is represented by a provincial health officer and a veterinary health officer, whose work is co-ordinated by the Prefect. They are given technical advice by a provincial health council, under the chairmanship of the Prefect.

At commune level, the mayor is the chief health authority. He is assisted by the physician-in-charge of the commune health department, who is the representative of the Ministry of Health at municipal level and is supervised by the provincial health officer.

A feature of Italian medical care is the "condotta medica", a dispensary under the direction of a physician, who is appointed by the commune authorities responsible for the care of the sick. There are a very large number of these dispensaries in the country, and in the larger urban centres they are attached to the local health departments.

The public hospitals are mainly run by local voluntary organizations, but are subject to the administrative control of the Prefecture and the Ministry of the Interior and to technical supervision by the appropriate provincial health office.

Some 85% of the population are covered by a health insurance scheme.

**Undergraduate medical studies**

The 23 schools of medicine in Italy are attached as faculties to the universities, which are owned and operated by the State. Responsibility for the curriculum, the system of examinations, and the distribution of financial grants rests with the Ministry of Education. However, each university has considerable autonomy in both teaching and administration. Academic policy is decided by the Senate, which is composed of the deans of the various faculties. The full professors of each faculty constitute the Faculty Council, presided over by the Dean. He is elected by the Council, holds office for three years, and is eligible for re-election.

Despite local variations in teaching the curricula in all schools are very similar, and students can move freely from one school to another.

**Conditions of admission and duration of study**

Students must be in possession of either the *maturità classica* or the *maturità scientifica* certificate, obtained on completing higher secondary education. There is no special selection procedure or entrance examination, and no *numerus clausus*. 
The course lasts six years and is divided into three two-year periods. The first period includes the basic sciences, human anatomy and physiology, microbiology, and genetics. The second covers pharmacology, pathological anatomy, medical and surgical pathology, introduction to medicine and surgery, semeiology, psychology, history of medicine, and certain special clinical subjects.

The last two years are devoted mainly to clinical work, but include hygiene, legal medicine, industrial medicine, phthisiology, and anthropology. Students must choose three optional subjects. The selection varies from one faculty to another, but normally includes such subjects as paediatrics and child health, the study of phthisis, preventive medicine for occupational diseases, psychotechnics, and other subjects allied to preventive medicine and public health.

Examinations are held at the end of each academic year. A student may not proceed to the next two-year period until he has successfully completed all the appropriate examinations. After passing his final examination, he receives the *Laurea in Medicina e Chirurgia*. He must then perform six months of practical hospital work in medicine, surgery, and obstetrics, and then has to pass the State examination before he receives a licence to practise.

*Teaching of public health*

Public health and hygiene are taught in the fifth year in the faculties of hygiene. In general the basic course is very similar at all universities, and covers environmental hygiene and preventive and social medicine. Professors of hygiene are anxious to standardize their courses, and in 1966 the National Congress of Hygiene devoted its attention to “preventive medicine”, organizing a round-table discussion between hygienists and clinicians to study the relationships between clinical disciplines and hygiene and preventive medicine.

The length of the theoretical course is generally the same at all universities and consists of three hours of lectures weekly for one academic year. The practical part of the course varies somewhat from school to school, and includes visits, practical work, and sometimes seminars.

Different schools accentuate different aspects of the course. In Milan, for instance, the stress is placed on aspects of virology, although not to the exclusion of other matters. The teaching programme includes:

<table>
<thead>
<tr>
<th>Hours</th>
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<tbody>
<tr>
<td>Introduction: definitions of “hygiene”</td>
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<tr>
<td>Statistical method and demography</td>
</tr>
<tr>
<td>General epidemiology: causation of disease, infectious diseases, predisposing conditions inherent in micro-organisms</td>
</tr>
<tr>
<td>Physical environment: climate</td>
</tr>
<tr>
<td>Social environment</td>
</tr>
<tr>
<td>Nutrition</td>
</tr>
</tbody>
</table>
General preventive medicine, including sub-clinical states, health examinations, etc. 6
Organization of state health services 3
Special epidemiology and prevention of communicable diseases of viral origin 8
Special epidemiology and prevention of communicable diseases of bacterial origin 8
Epidemiology and prevention of non-infectious diseases, such as cardiovascular disease and tumours 4
Environmental sanitation: water supplies, sewage and garbage disposal, pollution of the atmosphere, food and milk hygiene, etc. 4
Total hours 52

There are also some 30 hours of practical work, demonstrations and visits. The visits take in many of the important institutions concerned with preventive medicine and hygiene, such as dispensaries for tuberculosis and cancer, maternal and child health services, school health services, the Institute of Virology, the Provincial Laboratory for Hygiene and Prophylaxis, and infectious disease hospitals.

At Perugia, on the other hand, the accent is placed right from the start of the course on the teaching of statistics, in order to develop the skills essential for the appreciation and solution of elementary health problems. This course includes:

- Study of the basic concepts of probability
- The theory of errors
- Graphic representation, diagrams and histograms
- Demography (static and dynamic)

Much use is made of seminar teaching. Throughout the year, seminars of 10-12 students are organized under the guidance of specialized tutors; one student prepares an introductory statement on a subject currently being taught, and the topic is then open to discussion by the group. The Faculty believes that in certain cases this method of teaching, in which the students actively participate, has many advantages over ex cathedra didactic teaching.

Similar variations on the basic theme of hygiene are found in Italy's other medical schools.

Postgraduate education

In Italy there are no State regulations specifically governing postgraduate teaching in hygiene or public health. Some 16 universities offer a variety of specialization courses in hygiene and allied subjects. Courses in hygiene last two years, and only 10-15 students are admitted to each. Details of the curriculum and similar matters are decided by each university. However, a government regulation requires all candidates for posts of provincial medical officer to take a competitive examination in Rome. Legislation that will to some extent modernize and standardize the different university courses is under consideration.
Three specialization courses are offered at the University of Rome:
(1) hygiene
(2) hygiene and school medicine
(3) hygiene and hospital techniques.
Similar courses are available individually elsewhere, while Pavia offers a course in food hygiene and Perugia a course in health education (in effect a course in hygiene and preventive medicine, with the accent on health education).
At Milan postgraduate students of hygiene spend 4 hours a day, 3 days a week, on theoretical subjects, and 3 days a week on practical work and demonstrations in the municipal hygiene office and the Institute of Hygiene.
The course includes:

<table>
<thead>
<tr>
<th>First year</th>
<th>Hours per week</th>
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</thead>
<tbody>
<tr>
<td>General and special hygiene</td>
<td>8</td>
</tr>
<tr>
<td>Microbiology and immunology</td>
<td>8</td>
</tr>
<tr>
<td>Parasitology</td>
<td>4</td>
</tr>
<tr>
<td>Sanitary legislation</td>
<td>4</td>
</tr>
<tr>
<td>Statistics and demography</td>
<td>4</td>
</tr>
<tr>
<td>Zoonoses, inspection of meat</td>
<td>4</td>
</tr>
<tr>
<td>Aspects of pathological anatomy and histology</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>36</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Second year</th>
<th>Hours per week</th>
</tr>
</thead>
<tbody>
<tr>
<td>General and special hygiene</td>
<td>8</td>
</tr>
<tr>
<td>Clinical aspects and pathology of communicable disease, toxaeasias,</td>
<td>6</td>
</tr>
<tr>
<td>deficiency diseases</td>
<td></td>
</tr>
<tr>
<td>Hereditary diseases, etc.</td>
<td>2</td>
</tr>
<tr>
<td>Sanitary engineering</td>
<td>6</td>
</tr>
<tr>
<td>Chemistry applied to hygiene</td>
<td>4</td>
</tr>
<tr>
<td>Physics applied to hygiene</td>
<td>4</td>
</tr>
<tr>
<td>Geology applied to hygiene</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>34</td>
</tr>
</tbody>
</table>

Students cannot proceed to the second year until they have passed all first-year subjects. At the final examination, taken before a jury of 5–7 professors, the students are questioned on the various subjects. To obtain the diploma they must submit a thesis, which may be either the result of experimental work or based on a survey of the literature.

Hygiene and hospital techniques

A two-year course in hygiene and hospital techniques is given in Rome, in the Institute of Hygiene of the Faculty of Medicine and Surgery. Candidates having degrees in medicine and surgery, architecture, or engineering are admitted.
In each year the subjects are divided into three groups, and there is a theoretical and practical examination in the subjects of each group. Students are required to prepare and defend a thesis on an appropriate subject.

A candidate who passes all the examinations and whose thesis is accepted receives the title of "specialist in hygiene and hospital techniques".

The subjects covered are as follows:

**First year**

*Group 1: History and methods of medical care*
  - Hospital statistics

*Group 2: General hygiene in the hospital milieu*
  - Epidemiology and general prophylaxis
  - Direct prophylaxis (notification, disinfection, etc.)
  - Specific prophylaxis (immunization, chemoprophylaxis, etc.)

*Group 3: Microbiology*
  - Bacteriology
  - Chemistry and physics applied to food hygiene

**Second year**

*Group 1: Organization and function of hospitals*
  - Legislation: legal and administrative aspects of hospital services

*Group 2: Methods and techniques of management*
  - Selection and training of hospital staff

*Group 3: Architecture and construction of hospitals*
  - Technical aspects of hospital supplies and equipment

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**MALTA**

Population (1962) 329,011

The State of Malta is a group of islands in the Mediterranean. Public health, hospital and medical services are administered directly by the Chief Government Medical Officer, who is responsible to the Minister of Health. Under the CGMO there are three divisions of the Health Ministry, dealing with administration, public health and hygiene, and medical care. There are five area medical officers of health, who are responsible for the environmental health services. The school health services are the responsibility of the CGMO, and have a staff of seven medical officers and five dental officers.

There are 17 hospitals, 12 of which, including special hospitals, are Government-owned. An institute of health and a public health laboratory are maintained by the Government.
There is no national health insurance scheme, but medical care and maintenance in State hospitals, together with drugs, medical aids and apparatus, are provided by the Government under the National Assistance Act 1956. Any person is entitled to free medical care if the total weekly means of his household do not exceed the scale rate applicable to the number of persons in that household. The relative scale rates bear a reasonable proportion to average wage levels in Malta, and the system gives medical protection to at least 50% of all classes of employees and their wives and children. Additional cover is given to persons requiring long-term treatment.

Undergraduate medical studies

The Faculty of Medicine and Surgery of the University of Malta had its origins in the School of Anatomy and Surgery created in 1674. The University is now a completely independent and self-governing body, although it receives financial support from the Government. The Vice-Chancellor and Rector Magnificus is head of the University in both administrative and academic matters. Each Faculty Board consists of the Vice-Chancellor, the teaching staff of the faculty, and a number of examiners. A Dean is elected for a three-year term of office by the Faculty Board from among the professors.

Conditions of admission and duration of study

Candidates for admission are required to pass the University’s matriculation examination (or its equivalent). Catholic candidates must also pass an examination in religious doctrine. The entire course lasts seven years, comprising two years of pre-medical studies, two years of pre-clinical studies and three years of clinical studies. Students are only admitted to the pre-clinical part of the course when they have attended regularly a course of lectures in philosophy and have passed both parts of the examination in philosophy that forms part of the Intermediate Arts Examination. They are also required to have passed or obtained exemption from the Preliminary Science Examination in physics, chemistry, and biology. The degree of Doctor of Medicine and Surgery qualifies its holder for a warrant to practise medicine in Malta, and is accepted for registration in the United Kingdom.

Teaching of public health

The teaching of hygiene takes the form of lectures, practical classes for the laboratory aspects, seminars, and visits to centres of heavy and light industry. Teaching is spread over the second clinical year of the medical course and includes some 50 lectures, five of which are given by a visiting
professor. Practical classes and seminars are taken by medical officers of health, occupational health officers, and public analysts. Students also study bacteriology and parasitology, and are examined in these subjects during the second pre-clinical year. The teaching of social and preventive medicine is the responsibility of the Department of Medicine. There is a part-time lectureship in this subject and teaching is also given by the Senior Health Officer, the Senior Occupational Health Officer, the Senior Laboratory Officer, and the Tuberculosis Officer.

The syllabus is shown in detail below. Certification of death, and questions of national insurance, life assurance, and workmen's compensation are dealt with during the forensic medicine course.

Hygiene and preventive medicine
- Meaning and scope of hygiene and preventive medicine
- Principles and methods, with a brief historical outline of their development
- Health and disease, principal social and environmental conditions that affect health
- Nutrition: food in relation to health
- Air and its effects
- Water and its effects on health
- Habitations, importance of housing in relation to health
- Personal hygiene
- Maternal health and welfare
- The health and welfare of the infant and young child
- School hygiene and the social medical service
- Mental health
- Occupational health
- Rehabilitation and resettlement
- Outlines of sanitary laws and institutions

Epidemiology
- Communicable diseases and principles of epidemiology
- Prevention of communicable diseases
- Prophylaxis through treatment
- Infections carried by ships and aircraft
- International sanitary measures
- Social hygiene
- Prevention of some of the commoner non-infectious diseases and conditions

Vital statistics
- Practical utility
- Methods of collection and calculation
- Means, errors, correlation
- Theory of probability
- The census—population
- Birth, death, sickness, marriage rates
- Demonstrations of a "short life table"

Practical work is carried out on air, water, and various food-stuffs. It includes inspections of and visits to dwellings, schools, and factories, and demonstrations at an occupational health unit.
At the end of the year there is an examination comprising a written paper, a practical test, and an oral examination.

Postgraduate education

There are no organized postgraduate courses in Malta leading to a degree or diploma in public health or hygiene.

Research

The Faculty's Public Health Department is at present carrying out two research projects in public health. The first is a haemoglobin survey amongst workers exposed to lead in printing and other industries, and the second is a survey for the years 1963-65 of cases of malignant neoplastic disease admitted to all hospitals, government and private, in the island of Malta.

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NETHERLANDS

Population (1962) 11,797,199

The responsibility for public health in the Netherlands rests with the Minister of Social Affairs and Public Health. The public health wing of the Ministry is headed by two Directors-General, who are advised by a number of councils. There is a system of "State inspectorates", headed by a Chief Health Officer, which are responsible individually for medical care, environmental sanitation, mental health, pharmaceutical matters, foodstuffs control, and veterinary public health.

The school health services, which are run by the local authorities and are solely preventive, work under the supervision of the Ministry of Social Affairs and Public Health. Occupational health services are subject to inspection by the Ministry, but are organized by the industrial undertakings.

Much of the general preventive work is carried out by the voluntary health-care organizations ("Cross associations"). Traditionally these were concerned with health centres for infants and young children and for the care of tuberculosis patients, but now their work has been widened to provide mental health services and services for the care of the aged and of rheumatism and cancer patients.

At provincial level, there are provincial health councils, the primary responsibility of which is to co-ordinate the health work of the local
authorities and the voluntary organizations. Regional health officers are appointed by the Ministry. They are State civil servants, who work in the provinces in an advisory or supervisory capacity and meet regularly with the Chief Health Officer in charge of the State inspectorates.

Large towns (in general those with over 50,000 inhabitants) have municipal health services, headed by a city health officer, with a staff of health officers and specialists. They are employed by the municipal authority and are answerable to it alone. They are responsible for both public health and medical care services.

In rural areas most of the day-to-day public health work is in the hands of the voluntary health-care organizations, which employ general health officers and various specialists. The staff is responsible to the boards of these health-care organizations, but since much of the work is subsidized by the central government there is a strong central influence. The supervision of rural public health work is one of the responsibilities of the provincial health officers.

Environmental sanitation is a matter for local authorities, although the quality of drinking water is inspected four times a year by the central public health authorities.

Undergraduate medical studies

There are seven medical schools in the Netherlands. Of the universities to which they are attached, four are State universities, two are denominational, and one, the University of Amsterdam, is a municipal institution. Even in the case of the three non-State universities, the bulk of the funds are provided by the State. The governing bodies vary in composition, and at the State universities administrative matters are dealt with by a College of Curators responsible to the Minister of Education. Its members are appointed by the Crown and are not on the University staff. Academic affairs are the responsibility of the university senates or equivalent bodies presided over by the Rector Magnificus, who in the case of the State universities is appointed by the Crown.

Academic staff are appointed by the governing bodies on the recommendation of the faculties and must be approved by the Minister of Education and by the Crown.

Conditions of admission and duration of study

The basic requirement for admission to a medical faculty is possession of the secondary school certificate in science. Latin is not compulsory. There is no official *numerus clausus*, but the number of places is restricted.

The course lasts seven years and is divided into four periods:
(1) Pre-medical (one year), consisting mainly of physics, chemistry, and biology.

(2) Pre-clinical (two years), mainly comprising anatomy, physiology, biochemistry, pharmacology, and pathology, with some introduction to clinical medicine in the third year.

(3) Theoretical-clinical (two years). During this period, lectures and demonstrations are given in all clinical subjects and microbiology, parasitology, hygiene, and social medicine. As yet students do not normally work in the wards during this period, but this practice is to be introduced.

(4) Practical-clinical (two years). During this period, students undertake clinical work in hospitals. They help in the routine work in the wards and out-patient departments, and receive bedside instruction and lectures on aspects of their practical work.

Three major examinations are taken during the course:

(1) The kandidaatsexamen: part I after the first year, part II after the third year.

(2) The doctoraalexamen: this is held in two parts at the end of the fifth year, and includes microbiology and hygiene.

(3) The artsexamen: part I at the end of the sixth year, part II at the end of the seventh year.

The examinations are oral, practical, and clinical, and many students take eight or nine years to complete them all.

No university degree is conferred after passing the artsexamen, but the names of successful candidates are inserted on a register of persons authorized to practise medicine.

Teaching of public health

The University of Amsterdam has been selected to illustrate the teaching of public health (Table 14). As elsewhere in the Netherlands it is planned to change the curriculum in the near future. In addition to the courses shown in the table, a number of subjects related to public health are taught in the first and second years, within a course entitled “anthropobiology” (cultural anthropology). This course includes such subjects as ecology, psychology, eugenics, anthropogenetics, sociology, and theoretical biology (anthropology). Under the proposals for revision of the curriculum it will become a set course in medical sociology. Human heredity and genetics are further considered in a course on physical anthropology.
Teaching of statistical method (a compulsory 12-hour course) starts in the pre-medical year and is largely repeated during the teaching of other subjects.

Microbiology, hygiene, and epidemiology. At present the subjects covered by this heading are taught in the fourth and fifth years, but in the future the teaching of epidemiology will start in the second semester of the third year. The course starts with the study of medical bacteriology and virology, and epidemiological aspects are stressed by such means as taking cultures from the students’ own noses, throats, skin, etc. Other subjects include the typing of micro-organisms, disinfection, and the examination of water and milk. There is close liaison between the Departments of Epidemiology and Parasitology.

In the next semester the teaching of epidemiology starts with two introductory lectures, followed by a survey of vital statistics covering the general aspects of demography, mortality, and morbidity. Some specialized subjects are dealt with, such as smoking and lung cancer, accidents, etc. In addition, epidemiological aspects are dealt with in a number of joint lectures given by the clinical and laboratory staff of the Medical Faculty. Finally, the course deals with the epidemiology of the main infectious diseases and methods of prevention. Certain special subjects are treated individually, such as hospital infections, food poisoning, water, sewage, immunization, and legal procedures. The time devoted to each subject is shown below:

<table>
<thead>
<tr>
<th>Subject</th>
<th>Year</th>
<th>Theoretical</th>
<th>Practical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parasitology*</td>
<td>1</td>
<td>26</td>
<td>9</td>
</tr>
<tr>
<td>Medical psychology</td>
<td>2</td>
<td>26</td>
<td>—</td>
</tr>
<tr>
<td>Microbiology, hygiene, and epidemiology</td>
<td>4</td>
<td>26</td>
<td>27</td>
</tr>
<tr>
<td>Medical bacteriology and virology</td>
<td>4, 5</td>
<td>64</td>
<td>—</td>
</tr>
<tr>
<td>Epidemiology and vital statistics</td>
<td>5, 6</td>
<td>7-10</td>
<td>3 weeks’ clerkship</td>
</tr>
</tbody>
</table>

* There are few lectures, as social medicine is mainly studied from textbooks.

** The course on the epidemiology of parasitic diseases is given with the course on bacteriology and virology in the fourth year.
Three times a year there are afternoon discussions with groups of students on the subjects treated in the lectures. Students interested in special fields are given an opportunity for research and for writing up a study that may count towards their doctoraalexamen.

At the end of the fourth year students have to pass a written examination in subjects taken during that year. At the end of the fifth year, the first part of the doctoraalexamen includes an oral examination in epidemiology, including microbiological aspects.

**Hygiene and occupational medicine.** This is a course of some 25 lectures (Table 15) covering the aspects of hygiene not touched upon by the Department of Microbiology, Hygiene and Epidemiology. The subject is included in the doctoraalexamen at the end of the fifth year.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Hours</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mainly occupational</td>
<td>Mainly environmental</td>
</tr>
<tr>
<td>General introduction</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Chemical factors</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Physiology of activity</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Physical factors</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Mental load</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Physical factors</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Radiation</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Noise</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Environmental factors and diseases:</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Blood diseases</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Pneumococci</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Bronchitis, emphysema</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Cardiovascular diseases</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Malignant tumours</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Occupational medicine (organization)</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>General problems of environmental hygiene</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Maximum permissible limits</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Ergonomics</td>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>

The aim of this course is to give the students a general view of the significance of physical and mental activity and of physical and environmental influences. In addition to occupational medicine, the course covers some problems of sports physiology, recreation, etc. In most lectures occupational and environmental problems are not separated but the general aspects of activity relevant to both occupational and environmental situations are dealt with. At present there are no group discussions, visits or practical
work, but it is planned to organize excursions to appropriate industrial premises and public health institutions.

**Social medicine.** In view of the extensive teaching in other departments, between which there is good co-ordination, this course is limited to medicine and the law, social security, legislation and practice in relation to medical and health care, the organizational principles of health care, and description of organizations.

The course comprises theoretical teaching during the fifth year and 3 weeks' full-time clerkship during the sixth year. In the fifth year students are expected to master the contents of a text-book in their own time. This study replaces formal lectures in the subject, but 3–4 hours are set aside before the examination to clarify any points arising from the study of the book.

When the students have had time to read the book, they attend three informal seminar discussions in groups of 30. These discussions last 2–2½ hours, and audience participation is satisfactory. The subjects introduced are basically clinical; the pattern of the usual clinical presentation is followed, since that is the way students are trained to approach a problem, but naturally the clinical aspects are kept in the background and discussion centres on the social aspects.

Sometimes an actual patient is introduced, but more often the "built-up case" method of Richard Cabot is used. This involves presenting an imaginary clinical case and adding information in 4 or 5 stages by means of mimeographed slips. For example, the clinical information may be limited to: “Patient X has suffered a serious street accident which requires amputation of his right arm below the elbow”. Six variations are then introduced for discussion (young skilled workman, older factory hand, independent watchmaker with repair shop, schoolboy, housewife, widowed pensioner living alone), to show the variety of social problems arising from a similar surgical lesion.

Frequently a social worker is present and discussion moves over wide fields such as legal and ethical problems, attitudes towards contraception, abortion, and euthanasia.

Students spend 2 of the 3 weeks of clinical clerkship in social medicine visiting the municipal health service and becoming acquainted with the work of various departments such as public health, port sanitation, school health services, mother and child care, mental health services, geriatric care, and social work generally. The last week is devoted to a study of the social implications of illness for hospital patients, and at least one home visit is carried out. Usually the students work in pairs, one playing the role of physician and the other acting as social worker. The clerkship ends with a discussion at which the cases are reviewed extensively and any relevant questions may be raised.

Social medicine is included in the first part of the doctoralexamen.
Postgraduate education

In the Netherlands new trends in the postgraduate teaching of public health can be clearly discerned, and new principles and practices are emerging to meet present-day conditions in community health. Much less emphasis is now being placed on the teaching of detail in hygiene generally and in the control of infectious disease.

The Director of the Netherlands Institute of Preventive Medicine\(^1\) has written: "The results of the rapid development of preventive medicine have been so beneficial that at present in technically highly developed countries a hygienic physical milieu is taken for granted. This has led to the focussing of interest on "well being", while "being well" has become the condition that is more or less normal to achieve".

This shift in emphasis also implies that the modern physician, besides studying the classical medical sciences—including bacteriology, nutrition and the study of harmful environmental factors—must also be armed with a knowledge of the sciences dealing with human behaviour. There is also an increasing tendency to concentrate on conceptual teaching and on problem-solving methods with universal application rather than on detailed teaching of present-day knowledge that will be outmoded tomorrow.

At the same time stress is laid on working as a team, where each member is responsible for his own subject within a structure rather than in a vacuum. Emphasis is placed on the social aspects of medicine and on behavioural sciences. This links up with the importance attached to weaning the students from an “individual” to a “community” attitude and to increasing emphasis on the study of administration and modern administrative practice.

Since the Netherlands is a very highly industrialized country, occupational health is also regarded as extremely important.

The main centre of postgraduate training is the Netherlands Institute of Preventive Medicine at Leiden, which is both a school of public health and a research institute. Part-time courses are given at most university schools.

Formal training does not lead to a diploma, but is essential for registration as a specialist in the specific branches of social medicine. The requirements for registration are laid down by the Public Health Specialists Training Board. After completing the formal course, the candidate must work for two years in his chosen branch of social medicine before applying for registration. Specialization in social medicine is not a compulsory requirement for the position of public health officer.

As in Belgium, the curriculum consists of a basic course followed by a course in a special branch of social medicine: (a) public health administration,

(b) maternal and child health, (c) occupational health, (d) social security (Utrecht), or (e) tropical medicine and hygiene (Leiden and Amsterdam). The basic course lasts four months full-time in Leiden, and one year part-time elsewhere. The special courses last about five months part-time.

The following courses are offered at Leiden: ¹

<table>
<thead>
<tr>
<th>Basic postgraduate course in social medicine (399 hours)</th>
<th>Number of working periods</th>
</tr>
</thead>
<tbody>
<tr>
<td>General introduction: purpose and concepts</td>
<td>6</td>
</tr>
<tr>
<td>Structure and functioning of health care: social security, curative and preventive care</td>
<td>58⁹</td>
</tr>
<tr>
<td>Environmental hygiene, including food, radiation, hygiene, and noise</td>
<td>23</td>
</tr>
<tr>
<td>Epidemiology, demography and statistics, including non-communicable diseases</td>
<td>91¹</td>
</tr>
<tr>
<td>Behavioural elements in public health care: medical sociology, human relations, health education</td>
<td>42</td>
</tr>
<tr>
<td>Discussion, evaluation of course</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>228</td>
</tr>
</tbody>
</table>

⁹ One working period is 14 hours.

¹ Includes 12 periods of visits to municipal health service.

<table>
<thead>
<tr>
<th>Postgraduate course in public health administration (231 hours)</th>
<th>Number of working periods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structure and functioning of health care in the Netherlands, including international comparisons</td>
<td>34</td>
</tr>
<tr>
<td>Selected aspects of environmental hygiene: housing and town planning, road traffic</td>
<td>13</td>
</tr>
<tr>
<td>Social and behavioural sciences: sociology, administration, law (19 periods), and economics (12 periods)</td>
<td>74</td>
</tr>
<tr>
<td>Discussion of theses and evaluation of course</td>
<td>11</td>
</tr>
<tr>
<td>Total</td>
<td>132</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Postgraduate course in occupational medicine (262 hours)</th>
<th>Number of working periods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry: organization, management, work of the industrial psychologist</td>
<td>11</td>
</tr>
<tr>
<td>Legislation: inspection</td>
<td>8</td>
</tr>
<tr>
<td>Men at work: physiology, psychology, and sociology</td>
<td>30</td>
</tr>
<tr>
<td>Work environment: physical and chemical aspects</td>
<td>18</td>
</tr>
<tr>
<td>Pathology and epidemiology</td>
<td>44</td>
</tr>
<tr>
<td>Industrial health services</td>
<td>22</td>
</tr>
<tr>
<td>Discussion and evaluation</td>
<td>7</td>
</tr>
<tr>
<td>Excursions</td>
<td>10</td>
</tr>
<tr>
<td>Total</td>
<td>150</td>
</tr>
</tbody>
</table>

¹ These courses are subject to continuing evaluation, and the content is liable to change from year to year.
Postgraduate course in maternal and child health (273 hours)

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical, mental, and social development of the child</td>
<td>26</td>
</tr>
<tr>
<td>Disorders and pathology, including physical and sensorial handicaps</td>
<td>18</td>
</tr>
<tr>
<td>Methods of general and special examination</td>
<td>23</td>
</tr>
<tr>
<td>Medical demography and epidemiology</td>
<td>12</td>
</tr>
<tr>
<td>Health education</td>
<td>2</td>
</tr>
<tr>
<td>Education and the school, including special educational services</td>
<td>23</td>
</tr>
<tr>
<td>Aims, organization, and functioning of maternal and child health services</td>
<td>15</td>
</tr>
<tr>
<td>Other provisions for children</td>
<td>26</td>
</tr>
<tr>
<td>Discussion of dissertations and evaluation of course</td>
<td>10</td>
</tr>
<tr>
<td>Total</td>
<td>156</td>
</tr>
</tbody>
</table>

At Leiden a number of short dissertations (scripties) are required. In the basic course the scriptie (some 4000 words) deals with an epidemiological subject and is written by groups of 2–4 students. In the other courses the scripties are written by individual students and may be rejected if not up to standard. For the occupational health course, three scripties are required: (1) a description of the factory where the student receives his practical training; (2) a hygiene survey of this factory, including data about health hazards, work load, etc.; (3) a report on a special investigation.

Diploma in International Public Health

The Department of Tropical Hygiene of the Royal Tropical Institute, Amsterdam, in conjunction with the Prince Leopold Institute of Tropical Medicine, Antwerp, conducts a course of one academic year leading to a Diploma in International Public Health. The course is held in alternate years in Belgium and the Netherlands and is given simultaneously in English and French. For fuller details see the section on Belgium, page 63.

Research

There is considerable interest in research into various aspects of public health practice in the Netherlands. At Amsterdam this has largely centred round evaluation of the achievements of medical care services.1

The Netherlands Institute for Preventive Medicine engages in research as well as teaching, and has a vast research programme into both technical subjects and public health practice. Its activities have included a series of studies to evaluate different aspects of the maternal and child health services, studies on the provisions made for the aged, longitudinal studies on the development of children and adolescents and their needs, and extensive studies in audiology and the ascertainment of deaf children.

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OVERALL RESPONSIBILITY FOR THE HEALTH SERVICES RESTS WITH THE MINISTRY OF SOCIAL AFFAIRS, BUT EXECUTIVE ACTION IS TAKEN BY THE DIRECTORATE OF HEALTH, WHICH IS HEADED BY A MEDICAL ADMINISTRATOR.

BETWEEN THE DIRECTORATE THERE IS, BROADLY SPEAKING, A TWO-TIER SYSTEM OF HEALTH ADMINISTRATION. AT PROVINCIAL LEVEL THERE ARE PROVINCIAL HEALTH OFFICERS APPOINTED BY THE KING-IN-COUNCIL WHO REPRESENT THE DIRECTORATE OF HEALTH AND WORK WITH THE PROVINCIAL CIVIL ADMINISTRATION. THEY ARE RESPONSIBLE FOR THE GENERAL SUPERVISION OF HEALTH AND HYGIENE MEASURES IN A PROVINCE, BUT ARE NOT DIRECTLY CONCERNED WITH THE ADMINISTRATION OF HOSPITALS. IN ADDITION, THEY HEAD THE PROVINCIAL COMMITTEES FOR ASSESSING BENEFITS DUE UNDER THE REHABILITATION AND DISABILITY INSURANCE SCHEMES. THIS SYSTEM PLACES THE PROVINCIAL HEALTH OFFICERS IN A KEY POSITION WITH REGARD TO MEDICO-SOCIAL WORK IN THE PROVINCES. IN THE PAST THEY WERE ALSO RESPONSIBLE FOR PSYCHIATRIC CERTIFICATION, BUT THIS TASK IS NOW BEING TAKEN OVER BY COUNTY PSYCHIATRISTS. THERE IS A GENERAL TREND TOWARDS INCREASING THE SOCIO-MEDICAL ASPECTS OF THE PROVINCIAL HEALTH OFFICERS’ WORK. THEIR STAFF INCLUDES A COUNTY PUBLIC HEALTH NURSE.

AT DISTRICT LEVEL, THERE IS A LOCAL PUBLIC HEALTH OFFICER (DISTRICT DOCTOR), WHO IS CHAIRMAN OF THE ELECTED LOCAL BOARD OF HEALTH. HE IS APPOINTED BY THE CENTRAL GOVERNMENT AND IS RESPONSIBLE FOR MEDICAL CARE, PUBLIC HEALTH, AND PREVENTIVE MEDICINE IN HIS DISTRICT. HE RECEIVES A SALARY FROM THE STATE FOR HIS PUBLIC HEALTH WORK, AND NORMAL FEES FROM PATIENTS AND HEALTH INSURANCE ORGANIZATIONS FOR HIS MEDICAL CARE ACTIVITIES. A PUBLIC HEALTH NURSE, WHO COMBINES THE WORK OF A HEALTH VISITOR AND A SANITARY INSPECTOR, WORKS WITH EACH DISTRICT DOCTOR.

BESIDES THE PROVINCIAL HEALTH OFFICERS, THERE ARE A SMALL NUMBER OF FULL-TIME PUBLIC HEALTH OFFICERS IN THE LARGE TOWNS AND IN A FEW Densely POPULATED RURAL AREAS. OSLO HAS A COMPREHENSIVE CITY HEALTH DEPARTMENT, BUT THIS DOES NOT COVER SUPERVISION OF HOSPITALS.

SEVENTY PER CENT OF HOSPITAL BEDS ARE MAINTAINED BY NATIONAL OR LOCAL GOVERNMENT AUTHORITIES. THE NATIONAL GOVERNMENT RETAINS RESPONSIBILITY FOR UNIVERSITY HOSPITALS AND FOR MENTAL AND TUBERCULOSIS HOSPITALS. THE PROVINCIAL (OR CITY) AUTHORITIES ARE RESPONSIBLE FOR THE LARGER GENERAL HOSPITALS, AND LOCAL AUTHORITIES FOR THE SMALLER ONES. THERE ARE PLANS TO CREATE AN ORGANIZED HOSPITAL NETWORK, AS IN SWEDEN.

SINCE 1957 THE LOCAL PUBLIC HEALTH DEPARTMENTS HAVE BEEN RESPONSIBLE FOR SCHOOL HEALTH SERVICES. THESE ARE ADVISORY SERVICES CARRIED OUT BY THE
district doctor in rural areas and by full-time school medical officers and nurses in large towns.

Norway has a compulsory national health insurance scheme covering hospital services, medical attention, some drugs, and transport to the nearest doctor. There is an interesting system of disability insurance and rehabilitation assistance, whereby no disability pension is received until the extent of possible rehabilitation has been assessed. Extensive assistance is available for various rehabilitation measures.

**Undergraduate medical studies**

The two medical schools are faculties of the universities of Oslo and Bergen. The universities are State-owned and responsible to the Ministry of Education. The chief administrative officer of each university is the Rector, elected by the teaching staff from among the professors for a term of three years. Similarly, the deans of the various faculties are elected from among the faculty professors for terms of three years, and may be re-elected.

At present some two-thirds of all Norwegian medical students are studying abroad. Graduates from foreign schools must study for a full semester in Norway and pass certain tests, depending on the country of study. This additional study includes a course in social medicine. In addition they must carry out the same postgraduate practical training as students at Norwegian medical schools.

**Conditions of admission and duration of studies**

Candidates for admission must have completed their secondary education and passed the final examination, the *examen artium*, with a major in science. Only a limited number of candidates are admitted, and acceptance is largely based on the marks obtained in the *examen artium*. Up to 25% of the total candidates, however, may be admitted on the basis of other educational qualifications that are considered relevant to the study of medicine; for these extra marks are awarded, calculated according to a fixed scale.

The course lasts six years and is divided into two periods: a pre-clinical period of two and a half years and a clinical period of three and a half years.

The pre-clinical period is in two parts. The first, of one year's duration, mainly covers philosophy (common to all university students), basic sciences, and psychology. The second part is devoted entirely to anatomy, physiology, and biochemistry.

Examinations are held at the end of each main stage of the curriculum. The first examination is in two parts, corresponding to the way the pre-clinical period is divided. To be admitted to the examinations, students must have followed the practical and clinical work prescribed, but attendance at lectures is not compulsory.
After a student has passed all the examinations, he receives the certificate of *Candidatus Medicinae*. He must then complete a period of one and a half years' postgraduate training, made up of six months in a hospital department of medicine, six months in a hospital department of surgery, and six months assisting a district public health officer with both clinical and public health work. He is then entitled to apply for a licence to practise, which is issued by the Minister of Social Affairs on the recommendation of the Director-General of Health Services.

*Teaching of public health*

The teaching of public health in Norway (Table 16) is divided between the Chairs of Social Medicine and Hygiene. As elsewhere in Scandinavia,

<table>
<thead>
<tr>
<th>Subject</th>
<th>Hours</th>
<th>Period</th>
<th>Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Genetics</td>
<td>40</td>
<td>I</td>
<td>2</td>
</tr>
<tr>
<td>Medical psychology</td>
<td>27</td>
<td>II</td>
<td>2</td>
</tr>
<tr>
<td>Logic and philosophy</td>
<td></td>
<td>I</td>
<td>2</td>
</tr>
<tr>
<td>Microbiology</td>
<td>155</td>
<td>II</td>
<td>2, 4, 6</td>
</tr>
<tr>
<td>Epidemiology (infectious diseases)</td>
<td>100</td>
<td>II</td>
<td>2, 4, 10</td>
</tr>
<tr>
<td>Medical statistics</td>
<td>30</td>
<td>II</td>
<td>4</td>
</tr>
<tr>
<td>Hygiene</td>
<td>54</td>
<td>II</td>
<td>9</td>
</tr>
<tr>
<td>Social medicine</td>
<td>80</td>
<td>II</td>
<td>8, 9</td>
</tr>
</tbody>
</table>

* Including 75 hours of practical work.

importance is attached to a full and fairly detailed course in hygiene in keeping with the dual role of the district public health officer. Nevertheless, there is a trend to leave the details for postgraduate instruction.

*Social medicine.* The teaching of social medicine at Oslo is in two parts. The introductory course, given in the eighth semester during clinical studies, comprises some 20 hours of socio-clinical teaching by a physician and a social worker. There are no lectures: students work in small groups to prepare and eventually present to the class the socio-medical aspects of individual cases. In the course of this they visit the patients' homes and places of work, and if necessary various social institutions. This introduction is concerned mainly with the social aspects of clinical medicine.

The second course in social medicine consists of some 60 hours of systematic teaching spread over four months. The main subjects covered are as follows:

*Health problems in Norway*
*Vital and health statistics; demography*
*Epidemiology of chronic diseases*
Factors in society influencing health
Impact of disease on society
Socio-medical problems of special categories: the blind and deaf, the physically handicapped, pregnant women, the elderly, children and adolescents, the mentally handicapped
Social problems: alcoholism, criminality, drug addiction
Laws and regulations
Duties of the physician
Medical ethics; relations with other health staff.

The teaching introduces as much discussion and seminar work as possible. As in Amsterdam, there is a good deal of "situational" teaching based on actual socio-medical problems. As well as writing a textbook on social medicine, the head of the Department has produced a handbook of exercises based on socio-medical case histories.

The rehabilitation and physiotherapy unit comes under the jurisdiction of the Department of Social Medicine in Oslo; the Department’s staff includes a professor, three assistant professors (including a sociologist), a social worker, and a medical scientific assistant. For the hospital rehabilitation work, a specialist in rehabilitation medicine is attached to the Department.

General practice is not used as a teaching area by the Department, but six months must be spent with a district public health officer before registration. In this way the student sees many aspects of "medicine outside the hospital" before he enters practice.

There is a written examination in social medicine.

Hygiene. The course in hygiene, given in the ninth semester during clinical studies, comprises 36 hours of lectures and demonstrations, and 18 hours of laboratory exercises, fieldwork exercises, and visits to institutions.

The main subjects covered in the lectures and demonstrations are as follows:

Historical review
Environmental hygiene; municipal and rural sanitation:

1. Principles of excreta disposal and sewage treatment
2. Refuse and garbage disposal
3. Camp hygiene
4. Insect vector and rodent control
5. Water supplies: protection and treatment
6. Food hygiene and control: milk, meat, food-handling, restaurant sanitation, food additives, pesticide residues, radiological sterilization
7. Housing and institutional hygiene
8. Industrial hygiene
9. Air pollution
Communicable diseases: epidemiology and control
Health control: health examinations, screening, tests, maternal and child health, the
Norwegian plant physician plan
Nutrition (also taught in physiology classes)
Personal hygiene and physical fitness.

The laboratory exercises deal with water treatment and control, food control, industrial hygiene, communicable disease control (particularly vaccination and inoculation), and nutrition (evaluation of diets). The fieldwork and excursions cover not only the usual sewerage plants, slaughter-houses, and refuse disposal plants, but also restaurants and canteens, elementary schools, Oslo University student health centre, industrial plants, etc.

Postgraduate education

Norway has no university course of diploma standard in public health. A very intensive residential refresher course for district public health officers is given at the Norwegian Postgraduate Training Centre for Health Personnel. This condensed course, which lasts about three and a half months and comprises some 500 teaching hours, concentrates particularly on:

Statistics
Epidemiology
Maternal and child health
School health and hygiene
Mental health
Environmental sanitation
Industrial hygiene
Administration and legislation.

Afterwards the course is discussed, and the participants take a written examination of 3 or 4 questions; these include a case for discussion, a question on laws and duties, and questions on one or more theoretical subjects, such as housing or old age.

The Postgraduate Training Centre organizes a variety of other courses, including courses for dental officers, public health nurses, milieu therapists (assistant psychiatric social workers), and hospital administrators.

In order that staff holding full-time posts in counties and municipalities or in the central government may receive more advanced training, Norway participates in the Scandinavian School of Public Health at Gothenburg. In addition, it has been usual for a number of public health officers to take degree or diploma courses in the United States or in the United Kingdom.

Research

The Postgraduate Training Centre carries out studies on subjects of interest to the administration, including the problems of elderly persons and
of epileptics, private practice, and the sociological problems connected with mental hospitals.

POLAND

Population (1967) 31 551 000

Responsibility for all aspects of health rests with the Ministry of Health and Social Welfare. The Ministry's policy is implemented by the local health authorities. The country is divided into 22 provinces, including five large towns with provincial status, and some 400 districts, including towns with district status. Within these again are the rural communes. The State takes full responsibility for all preventive and curative services.

The Ministry retains direct responsibility for the medical schools and for certain other matters, such as the care of mental patients and the supervision of medical research institutes. All other activities relating to health care, including the sanitary-epidemiological stations and hospitals, are delegated to the provincial and district departments of health and social welfare, at their respective levels. The provincial departments are also responsible for rehabilitation services, paramedical schools, provincial ambulance services, etc. The Ministry of Health and Social Welfare and the departments under its control are also responsible for school health services and industrial health services.

Treatment is given in towns at the local clinic, in rural areas at the health centre. These establishments are supervised by the district health and welfare department. Patients are seen at the clinic or in their own homes by the practitioner-in-charge, who is also responsible for preventive health care, environmental sanitation, health education, infectious disease control, and maternal and child health care in his area. He is assisted by one or more nurses and midwives, and in rural areas he runs a rural maternity home. Outside their normal hours of duty, doctors may engage in a limited amount of private practice, but only in their consulting rooms and never in the case of hospital patients.

Some 75% of the population receive free medical care under the social insurance schemes, contributions for which are paid entirely by the establishment where the insured person works. Those not entitled to free medical care, mainly independent farmers, can make use of hospitals or out-patient clinics at a relatively low fee, but preventive care is always available free of charge.
In many cases, the district medical officer is the superintendent of the district hospital, and the director of the district sanitary-epidemiological station is his deputy. Some rural health centres have no permanent doctors, only visiting physicians who are available for consultation on certain days. In the absence of a doctor, medical aides or nurses are made responsible for these centres; they keep in touch with the nearest rural health centre that has a doctor in permanent residence.

**Undergraduate medical studies**

During the Second World War, Poland's medical manpower was reduced to about half its former strength. To meet this emergency a number of new medical schools were established, one on an experimental basis. Medical education was reorganized on a new basis in 1950, and the schools were removed from the jurisdiction of universities and set up as independent medical academies under the supervision of the Ministry of Health and Social Assistance. There are now 10 of these academies¹, compared with five medical schools before the war. Each academy is headed by a Rector, and an Academic Senate of which the Rector is Chairman. Each faculty is headed by a Dean, supported by a Faculty Board.

The curriculum in all academies is uniform, but is subject to continuing experimentation and reorganization. At first a special course for paediatric physicians was organized from the third year of study onwards. This was carried out by the paediatric section of the general medical faculty, but has now been discontinued in all schools except Warsaw. Seven academies also have faculties of pharmacy, and eight have sections of stomatology within the general medical faculty.

**Conditions of admission and duration of study**

Candidates for entry to a medical academy must possess the secondary school certificate (obtained after 12 years' schooling) and pass an entrance examination in physics, chemistry, biology, and one foreign language.

The course now lasts six years, and can be divided into three parts: an introductory section including basic biology, introduction to medicine, and sociology; a pre-clinical section including pharmacology, microbiology, physiopathology, and elementary medicine and surgery; and a clinical section including clinical subjects and hygiene and sanitation.

After completing his studies, the medical student receives the title of *Lekarz* (physician). Before obtaining a licence to practise he must undertake a two-year internship in a hospital in four disciplines: medicine, surgery, gynaecology and obstetrics, and paediatrics.

¹ Not including a military medical academy supervised by the Minister of National Defence.
Teaching of public health

At present there is a Chair of General Hygiene in each medical faculty. A course in hygiene must be given in the fourth year of study, and a period of practical training in hygiene during the sixth year. The formal course covers:

(1) Hygiene and health protection; definition and scope; epidemiology as a basic research tool for hygiene; descriptive epidemiology; the evolution of the health status of the population.

(2) Medical statistics applied to epidemiology; analytical and experimental epidemiology.

(3) The influence on the population's health of natural ecological factors (air, soil, water, climate, ionizing radiation) and of changes in the environment due to modern civilization (industry, urban development, housing, construction, clothing, working environment, educational establishments, medical establishments, chemical factors linked with progress in technology, etc.); nutrition and food control, correct and defective nutrition.

(4) Genetic problems in human populations.

(5) The distribution of acute infectious diseases and chronic diseases of social importance; the principles of preventive action.

(6) Accidents and injuries: the nature and principles of prevention.

(7) Mental health: principles of protection.

(8) The socio-medical problems of gerontology and geriatrics.

(9) The organization of health protection: the sanitary-epidemiological service; maternal and child welfare, pre-school and school health; the industrial health service; Out-patient and hospital medical care; social welfare; specialized welfare; rehabilitation of the disabled; administration of the health and social welfare service.

(10) Socio-economic problems of health protection; systems of protection; health economics; legal principles of health protection; national and international organizations for health protection; etc.

During the sixth year, students must spend 100 hours in provincial sanitary-epidemiological stations. The bulk of this time is spent on practical work and tutorials in small groups; there are only some 13 hours of introductory lectures. In addition, the students take an active part in the work of the various sections of the station, such as the anti-epidemic, nutrition, school health and hygiene, environmental hygiene, occupational hygiene, and health education sections. The purpose of this training is to improve the students' knowledge and to give them a better understanding of the influence of environmental factors on the incidence and course of disease in the community.

However, it is widely felt that this system does not adequately meet present-day needs. Further reorganization of public health teaching is proposed, on the basis of experimental curricula in use at Lodz and Krakow (Table 17). This reorganization would place greater emphasis
on social medicine, spread the teaching more evenly over the whole course, and introduce a measure of integrated practical teaching, in particular with collaboration between the departments of hygiene, internal medicine, gynaecology and obstetrics, and paediatrics. By "social medicine" is meant the science that studies the theories, methods, and techniques of society's activities in the field of health in relation to its total activities. Stress is laid not only on establishing the health needs of society, but also on devising the optimum medical care pattern to meet these needs. The integrated practical sessions are designed to point out as far as possible the environmental, social, and biological factors affecting the health of a given individual. Both teachers and students have assisted in evaluating these integrated practical sessions, and changes have been made accordingly.

During the third year, each student attends two families. Data and observations on living, working, and social conditions, etc. are recorded in a specially designed questionnaire. There is further observation of families during clinical studies, and the material collected is discussed in seminars organized by tutors from the departments of clinical sciences, hygiene, and organization of health care.

It is suggested that the formal teaching in social medicine should be divided into three parts: (1) introductory studies in the first and second years, (2) general social medicine in the third year, covering theoretical concepts and methodology (research methods, epidemiology and statistics, and methods and techniques of action in the socio-medical sphere), and
(3) practical social medicine in the third and sixth years, dealing with the evaluation of health status and health needs (practical epidemiology and statistics, systems of health protection, and organization of health care in Poland). During the third period, particular emphasis should be placed on practice in establishments for health and medical care.

In this way the theme of social medicine will run through the students' entire studies, from their introduction to medicine in the first year, through hygiene and clinical subjects, to practical social medicine in the sixth year.

**Postgraduate education**

Organized postgraduate education in Poland includes specialization, in-service training, and refresher training. In addition, considerable emphasis is placed on self-improvement through the reading of journals and attendance at meetings.

Within the general field of public health and hygiene, a number of separate specialties have been established. Some of these can be studied at two levels (grades one and two).

Much of the training for specialist qualifications takes the form of in-service training. The organization of in-service training in all specialties throughout the country is aided by a network of advisers in the major specialties. An outstanding specialist acts as chief adviser in his field to the Ministry. In each of the 22 provinces there is a provincial specialist technically responsible to the national specialist. One of the duties of these specialists is to supervise the training of physicians in their field, and this activity is co-ordinated by the Postgraduate Medical School in Warsaw.

The training is carefully planned for each candidate, and his theoretical and practical knowledge is checked after completion of each section of the training internship, at least every six months.

Most of the refresher and specialization courses in the field of health protection are organized by the Postgraduate Medical School attached to Warsaw Medical Academy. These courses, given by the School's Department of Social Medicine, include:

1. **Extra-mural specialized basic course lasting two years.** Each course takes 175–185 students.

2. **Intra-mural basic course lasting three months.** It is divided into two periods of six weeks each, one in the spring, the other in the autumn. The course takes 20–30 students.

3. **Refresher seminar for specialists in social medicine and former students of courses (1) and (2).** This seminar, which lasts a week, is devoted to the work and progress of social medicine. It is held once or twice a year for 20–30 doctors.
The Postgraduate Medical School is also responsible for specialization in "organization of health care". This special qualification is necessary for all physicians engaged in the organization and management of medical care services, including the staffs of ministries and of provincial and district services of health and social welfare, and directors of hospitals and other health care units. Study for the Certificate in Organization of Health Care comprises 48 months of in-service training and course (1) or (2) above. The syllabus includes the following subjects:

Theory and practice of the organization of health protection:

(a) Health of the population and factors influencing it; theory and methodology of the diagnosis of the population's health;

(b) Activities concerned with the health of the population; the scope of health protection; public health policy;

(c) Types of action in the health-protection field (legal, economic, administrative, etc.); systems of medical care.

Historical development of the organization of health protection.

International problems in health protection: international health organizations; WHO and the other specialized agencies of the United Nations concerned with health problems; international collaboration in health matters; bilateral and multilateral conventions.

The organization and work of the medical services:

(a) The structure, functions, and administration of out-patient and in-patient medical care; basic and specialized medical care; paramedical services (linked with medicine); pharmaceutical and dental services, balneoclimatic stations;

(b) Planning, organization and evaluation of medical services.

The organization of health and epidemiological services; environmental health and epidemiology.

The organization of social welfare: medical assessment, the certifying of temporary or permanent occupational incapacity or disablement, rehabilitation of the disabled. Health legislation.

Health economics and its problems.

Medical and demographic statistics: the use of statistical methods and demographic indices for determining the health status of the population and evaluating medical activities.

The theory, practice, and scientific principles of the organization and administration of public health protection.

Health education.

Civil defence (including the organization of medical care in the case of a catastrophe).

Candidates are also required to submit a written dissertation and to pass two examinations in foreign languages. This is a grade two specialty only.

The School of Sanitation and Hygiene provides specialist training in more narrowly technical subjects within the field of hygiene and epidemiology, including the grade one specialty of general hygiene and epidemiology, from which physicians can go on to grade two specialization in epidemiology or in general hygiene. Other specialist courses organized by this School include school hygiene (grades one and two), and microbiology (grades one and two).
The School also organizes a number of shorter courses in subjects such as nutrition and food hygiene, occupational hygiene and safety, and health education. The refresher courses in hygiene for doctors of the sanitary and epidemiological service also take place in the School. These courses, organized by the State Institute of Hygiene, cover communal, occupational, food, and school hygiene, together with epidemiology and infectious diseases.

An outline of some of the major curricula is given below:

**General hygiene and epidemiology** (grade one)

The training period is 36 months, in-service only. The subjects include:

*Clinical and laboratory examinations*: especially the diagnosis, therapy and control of infectious diseases; principles of general epidemiology.

*Environmental hygiene*: town planning and communal hygiene.

*Nutrition and food hygiene*: general principles, nutrition of special groups, hygienic supervision of the production and distribution of food, food poisoning.

*Principles of occupational hygiene*: industry and agriculture.

*School health.*

Organization of sanitary-epidemiological services (including elements of statistics and demography).

General knowledge of relevant practical work (including application of sanitary regulations).

**Specialization in epidemiology** (grade two)

The course lasts for 36 months, and includes a 3-month course in the School of Sanitation and Hygiene. The curriculum includes:

*Infectious and inative diseases*: diagnosis, pathology, therapy, and prophylaxis of acute infectious diseases, zoonoses, and parasitic diseases; quarantine; elements of tropical diseases; basic immunology.

*Non-infectious diseases*: pathogenesis, diagnosis, prophylaxis, and therapy of neoplasms, cardiovascular disease, rheumatic fever, etc.

*Sero logical and microbiological diagnostic methods* (including collection of material and interpretation of results).

*Epidemiology and demography*: general epidemiology and special epidemiology of infectious diseases, statistical methods; collection and analysis of material; random sampling; demography and population studies; etc.

Organization of sanitary-epidemiological services: sanitary inspection and supervision of the community.

*Medical certification and medical regulations.*

**Specialization in hygiene** (grade two)

The course lasts 36 months, including three months of formal instruction. The curriculum includes:

*Epidemiology, statistics and demography*: general and special epidemiology of infectious and non-infectious disease; basic statistical methods; collection and analysis of data; demographic rates; standardization; etc.

*Environmental hygiene*: water, sewage, housing, institutional hygiene, school hygiene; hygiene of air, marine, and other transport; air, water, and soil pollution; town planning; protection against ionizing radiation; etc.
Nutrition and food hygiene: extension of instruction given in the course in general hygiene and epidemiology; examination and evaluation of nutritional status of populations; hospital dietetics; hygienic control of food industry and restaurants. Child health and hygiene: child development and morbidity; care of mentally and physically retarded children; hygiene of the education process; organization of schooltime and leisure; physical education and sport; school health services and hygiene. Industrial hygiene: physiology of work; the work-fatigue-leisure cycle; industrial hazards; diseases and toxicology; hygiene, sanitation, and safety in industry; the health care of workers; absenteeism; health education. Sanitary law and organization of sanitary-epidemiological services: sanitary supervision and anti-epidemic measures.

Candidates in the above subjects are required to submit a dissertation for each level of specialization; they must also learn one foreign language for the grade one course and another for the grade two course.

Finally, some public health training is included in the curricula of specialist courses in other branches of medicine.

In addition to the forms of specialization described, two higher degrees are awarded by the medical academies, the Polish Academy of Sciences, and by research institutes of the Ministry of Health and Social Welfare. The two degrees are Doctor of Medicine and Docent Habilitatus of Medicine. They are conferred on physicians who have shown by their research that they have achieved a high level of scientific attainment.

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PORTUGAL

Population (1962) 9 042 200

The main responsibility for health services rests with the Ministry of Health and Welfare. The Ministry has six main subdivisions: a National Board of Health and Welfare, a Co-ordinating Council, the Directorates-General of Health, of Hospitals, and of Welfare, and an Inspectorate of Social Welfare. The Ministry of Corporations and Social Insurance is responsible for most of the medical care outside hospitals, through the provident societies for workers in industry and commerce and for rural workers and fishermen. In this way some 3 150 000 workers and their families are assured of medical care.

Below Government level the health administration follows the structure of the civil administration. Each district has a full-time health officer, technical bodies responsible to the central technical institutes and the Directorate-General of Welfare, and district hospitals.
At commune level there is a deputy health officer or commune doctor responsible to the district health authorities for providing lower income groups with medical care and for certain public health duties. Local hospitals are mainly run by voluntary bodies, and in the larger towns they have both out-patient and in-patient services and provide some pharmaceutical assistance.

Although the situation has greatly improved in recent years, communicable diseases still present major health problems in Portugal; there are special dispensaries at district level, and district and commune health authorities collaborate in the control of communicable diseases.

The commune medical officers are also responsible for health in the primary schools. Doctors are appointed by the Ministry of National Education to look after health in secondary schools.

Charitable and religious bodies still play a large part in providing health services in Portugal. Public health, welfare, social insurance, and medical care are co-ordinated by an inter-ministerial council.

Undergraduate medical studies

The three medical schools in Portugal are faculties of State universities, which are financed by the Government and administered by the Ministry of Education. Each university is headed by a Rector and each faculty by a Director. The governing body of a university is its Senate, composed of a Rector, a Vice-Rector, directors of faculties, and representatives of the professors.

Appointments to Chairs in the faculties of medicine are made by public competitive examination, open only to candidates who hold the higher degree of Doutorado em Medicina (Doctorate in Medicine).

The curriculum is fixed by law and is identical for all three faculties. Each professor is required to submit his programme of study for approval, and each faculty must publish its study programmes at least once every three years. Directors of faculties are responsible for ensuring that the curricula in the three faculties are the same in their general outline.

Emphasis is placed on practical work; attendance at practical and clinical sessions is compulsory, but attendance at lectures is optional.

Conditions of admission and duration of study

Candidates for admission must have passed the secondary school examination and a faculty entrance examination in chemistry, physics, and biology. However, students who obtain at least 14 credits in these subjects in the secondary school examination are exempt from the faculty examination. There is no other limit on the number of medical students.

The course lasts seven years, including a final year of internship. The intern works in the wards and out-patient departments of the medical,
surgical, obstetrical, and paediatric sections. At the end of this period he must submit a dissertation on some aspect of his work in the laboratories or clinical departments.

After his dissertation has been accepted by the faculty, the student is awarded the degree of Licenciatura em Medicina (Licentiate in Medicine), which confers the right to practise medicine in Portugal.

Teaching of public health

In theory there is a Chair of Hygiene and Social Medicine at each university, but Coimbra is the only faculty with a Professor of Hygiene; at Lisbon and Oporto teaching in these subjects is carried out by part-time members of the Department of Bacteriology.

The academic year lasts from October to July, but because of examinations, etc., teaching takes place from November to late May or early June. The curriculum contains the following subjects related to public health:

<table>
<thead>
<tr>
<th>Year of studies</th>
<th>Bacteriology and parasitology</th>
<th>Hygiene and social medicine</th>
<th>Communicable diseases (clinical aspects)</th>
<th>Puericulture, with paediatrics</th>
<th>Legal medicine and forensic toxicology</th>
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<td></td>
<td>3</td>
<td>4</td>
<td>6</td>
<td>6</td>
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One to two hours a week are devoted to practical classes during the fourth year of studies (minimum of 20 hours). The practical course comprises (1) laboratory exercises bearing on such subjects as examination of drinking water, bacteriological and physiochemical tests of milk, and agglutination tests, (2) a series of discussions and seminars at which students develop a theme, followed by discussion in which an instructor acts as moderator, and (3) vaccination sessions at schools and health education work, in which the students take part. Visits are paid to the customary institutions, slaughter-houses, dairies, the BCG vaccine institute, and so on. Although it is considered desirable that students should carry out practical work in such institutions as special dispensaries, mother and child welfare clinics, etc., this has been found more difficult to arrange.

The theoretical course lasts some two hours a week throughout the academic year, and covers the following subjects:

Personal hygiene
Epidemiology: communicable and non-communicable disease
Environmental hygiene and sanitation
Nutrition and food hygiene
Organization of national and international health services
Biostatistics and demography
Social medicine:
  maternal and child welfare
  welfare of the aged
mental hygiene
occupational hygiene
accident prevention
"social" diseases: tuberculosis, venereal diseases, cancer, etc.
Elements of allied sciences:
sociology
climatology
biochemistry

There is no joint teaching with clinical departments and no organized case teaching on the social aspects of clinical medicine.

Postgraduate education

Postgraduate education in public health is at present undergoing changes. Until the academic year 1966-67, courses in this subject were given by the Dr Ricardo Jorge Advanced Institute of Hygiene in Lisbon and its branch at Oporto, but in 1967 this task was taken over by the newly established National School of Public Health and Tropical Medicine, formerly the Institute of Tropical Medicine. Henceforth the Advanced Institute will engage only in laboratory and research work.

Other subjects taught in the new school will include occupational health and tropical medicine, and hospital administration will be added in due course. The programme of studies has not yet been finalized, but the public health course, lasting one academic year, is intended as a first step on the way to further specialization. It will include considerable practical work in the field and in laboratories, and also conferences and group discussions. It is hoped to arrange periodic evaluations of the course.

Refresher courses for commune doctors

Since deputy health officers, or commune doctors, have public health responsibilities in addition to their clinical duties, short refresher courses are organized for their benefit. The subjects covered include:

Evolution of concepts of hygiene and public health in international and intergovernmental organizations
Health statistics in Portugal
Role of the deputy health officer in occupational medicine, hygiene, etc.
Administrative measures in the control of infectious disease: smallpox, whooping-cough, diphtheria, typhoid fever, tuberculosis, adenovirus infections, etc.
Silicosis
Medical examinations by health officials
Dermatological questions in public health
Immunizations, including poliomyelitis
Examination of building plans
The work of institutes for maternal protection
Food poisoning
Bacterial analysis of water
Sensitivity tests for antibiotics
Current aspects of commune health administration
Psychiatric emergencies
Rural nutrition.

All the lectures in this course are followed by a discussion, and various institutions are visited. In its design the course is comparable with the course for district health officers in Norway.

ROMANIA

Population (1963) 18,813,131

The Ministry of Health and Welfare is responsible for all preventive and curative care and is jointly responsible with the Ministry of Education and Culture for medical education. Administratively, Romania is divided into 16 regions, and two city-regions, Bucharest and Constanza. Each region is divided into districts, and these in turn are divided into communes of 3000-4000 inhabitants. Each region has its own health budget and is financially responsible for all health activities within its boundaries. It has a health and welfare section, which operates within the framework of the People's Councils, and health activities are directed by a regional chief medical officer. Similarly, the district People's Councils have health and welfare sections directed by a district chief medical officer.

In each commune there is a health unit, staffed normally by a general physician, a paediatrician, and a stomatologist, who are assisted by a number of paramedical and auxiliary health workers, nurses, and so on. This team is responsible for both public health and medical care in its commune. At district level there are general and special hospitals, polyclinics offering specialized services, and special dispensaries (tuberculosis, etc.).

Hygiene and epidemiological services are supervised through a network of regional and district State health inspectorates.

Industry is expanding rapidly in Romania, and great importance is attached to industrial medicine. There are over 90 industrial medico-sanitary departments, over 600 industrial dispensaries staffed by doctors, over 1000 dispensaries staffed by auxiliary workers, and important central institutes. A system of State sanitary and factory inspection operates
through the sanitary-epidemiological units at regional and district level. A new organization, the State Committee for Occupational Protection, has recently been created. It has regional and district branches, and is intended to promote the safest possible working conditions in the factories and industrial combinats.

School health and hygiene services are operated by the commune paediatricians and State sanitary inspectors.

Romania's health services are broadly of the same type as in other socialist countries. All physicians work as public servants.

Undergraduate medical studies

The five medical schools were transformed into independent institutes of medicine, or of medicine and pharmacy, in 1948. Each institute includes faculties of general medicine, stomatology, and paediatrics, and four of them have a faculty of pharmacy. These institutes are responsible to the Ministry of Education. Each institute is headed by a Rector, assisted by one, two or three Pro-Rectors, whose responsibilities are distributed according to problems: didactic, educational, and scientific. Each faculty is headed by a Dean, who is assisted by a Scientific Board composed of the faculty's professors.

Teaching programmes in general and curricula for individual subjects are fixed by the Ministry of Education, in collaboration with the Ministry of Health and Social Welfare. Heads of departments are able to develop their teaching programmes within the general outline given by the Ministry.

In accordance with the principles of socialist medicine, prevention permeates all teaching as far as possible, including the teaching of pre-clinical and clinical subjects. Briefly stated, the aim is to train public-health-minded general physicians and paediatricians to work in teams with paramedical and auxiliary workers in order to provide an all-round health service for their community.

Conditions of admission and duration of study

The number of applicants for medical courses far exceeds the number of vacant places, and after obtaining the secondary school certificate students must take a further competitive examination. The annual number of admissions is determined by the Government, and depends on the country's need for medical staff and on the number of vacancies.

The duration of study is six years. At the end of this time the student takes a State examination in order to obtain the diploma of Medic (Physician). During the first four years, students in the faculties of general medicine and paediatrics follow the same programme. From the beginning of the first year of studies, the faculties of stomatology and pharmacy have separate programmes. Practical education in the main disciplines takes the
form of half-yearly externat courses for all students. The students' duties include caring for the patients (depending on the courses they have taken), and for this they are remunerated.

This form of education, which applies to the fourth, fifth, and sixth years in the faculties of general medicine and paediatrics, and to the fifth and sixth years in the faculty of stomatology, is called general externat. In addition, during the last year of normal studies a limited number of students are admitted to an internat by a competitive examination. The internat courses last three years for the faculties of general medicine and paediatrics, and two years for the faculties of stomatology and pharmacy.

Because the students are selected by a competitive examination, the internat represents a higher form of training for those who have been most successful in their studies, and gives them an opportunity to perfect their general training in the field of medicine (cf. France).

Teaching of public health

Throughout the system of medical education there is close collaboration between medical faculties and the institutions of the public health services. There is therefore a close link between undergraduate teaching, postgraduate teaching, and the public health services.

The teaching of public health and hygiene (see Table 18) is conducted along three parallel, but carefully co-ordinated, lines:

1. A series of special subjects relating to hygiene and public health, taught from the third to the sixth year of study.

2. A number of subjects relating to political and social sciences.

3. The teaching of preventive and social aspects in connexion with both basic and clinical subjects. Determined efforts are being made to broaden this aspect of clinical teaching.

| TABLE 18 |
| SUBJECTS RELATED TO PUBLIC HEALTH IN THE UNDERGRADUATE CURRICULUM, ROMANIA |

<table>
<thead>
<tr>
<th>Subject</th>
<th>Number of hours</th>
<th>Semester</th>
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<tr>
<td></td>
<td>Total</td>
<td>Theoretical</td>
</tr>
<tr>
<td>Political, economic, and social sciences*</td>
<td>240</td>
<td>120</td>
</tr>
<tr>
<td>General, communal, and school hygiene</td>
<td>113</td>
<td>67</td>
</tr>
<tr>
<td>Food hygiene</td>
<td>75</td>
<td>38</td>
</tr>
<tr>
<td>Occupational medicine (occupational hygiene and occupational diseases)</td>
<td>86</td>
<td>38</td>
</tr>
<tr>
<td>Epidemiology</td>
<td>75</td>
<td>38</td>
</tr>
<tr>
<td>Organization of public health</td>
<td>74</td>
<td>38</td>
</tr>
<tr>
<td>Communicable diseases</td>
<td>284</td>
<td>38</td>
</tr>
<tr>
<td>Microbiology and parasitology</td>
<td>165</td>
<td>75</td>
</tr>
<tr>
<td>History of medicine</td>
<td>19</td>
<td>19</td>
</tr>
<tr>
<td>Biostatistics</td>
<td>30</td>
<td>15</td>
</tr>
</tbody>
</table>

* Common course for all university students.
The programme in public health and hygiene in paediatric faculties is almost identical with that in faculties of general medicine, the main difference being that paediatric students have more lectures on school hygiene and fewer on occupational hygiene.

Great importance is attached to practical training. This is given not only in hospitals, but also in State sanitary inspectorates, dispensaries, and urban and rural health units. Practical instruction in hygiene and public health includes a series of practical sessions for about 20 weeks during the sixth year. These consist of demonstrations, laboratory work, visits to specialized departments, compilation of epidemiological surveys, health studies, etc. The students work from 7.30 to 11.30 a.m. in various institutions of the health service, and afterwards take part in courses related to their practical work.

Since the practical training programme in public health and hygiene is an essential aspect of medical education in Romania, the subjects covered by it are shown below:

**Communal hygiene**
- Preparation of files for communal hygiene activities in the territory of a health unit
- Establishment, correction, and implementation of a plan of action for the unit
- Sanitary control of central and local water supplies
- Sanitary control of sewage disposal
- Air pollution control
- Disposal of solid wastes, and their use in agriculture
- Study of housing
- Study of hospitals and other health institutions
- Study of schools and various children’s institutions
- Supervision of public premises (swimming-baths, beaches, sports centres, hotels, hair-dressing saloons, etc.)
- Study of State collective farms and temporary farm units
- Study of traffic noise, traffic jams, etc.
- Study of radioactive sources and the necessary protective measures
- Participation in the preparation of expert proposals for communal hygiene facilities.

**Food hygiene**
- Preparation of nutrition standards for various group catering establishments
- Study, based on questionnaires, of the alimentary value of foods used in a canteen
- Composition of menus for various workers, in relation to work performed
- Evaluation of the nutritional status of workers
- Epidemiological survey of a food-poisoning outbreak.

**Industrial hygiene and occupational disease**

*In the industrial health unit*

- Description of technological processes; assessment of workplaces, including the working environment (air pollution, ventilation, lighting, noise, and hygienic installations); proposals for improvement
Characterization of workplaces in terms of physiology and hygiene; proposals for rationalization

Survey of occupational diseases, relation between symptomatology and work environment; deficiencies and proposals for improvement; statutory notification of occupational diseases

Preparation of questionnaires for a survey of accidents, preventive measures, and statutory notification of accidents; survey of first-aid services in industrial plants

Participation in pre-employment and periodic examinations, follow-up of the adaptation of new workers, transfer of workers to non-exposed workplaces.

In a hospital department for occupational diseases

Clinical and laboratory examination, diagnosis and treatment; functional tests of respiratory and cardiovascular systems; compilation of questionnaires for examination of plant premises.

Epidemiology

Organization of community immunization: card indexes, etc.
Immunization, follow-up of reactions
Skin tests for pre-immunity sensitivity of a population, evaluation of immunity
Epidemiological survey in sporadic foci; follow-up of remedial measures
Preparation of forms for statutory notification, preparation of monthly reports
Follow-up and control of carriers
Detection of parasites, prophylactic measures on State collective farms
Disinfection and disinfection
Application of legal regulations concerning sanitary-epidemiological measures.

Public health

Organization of the work and utilization of the staff of a health unit, including studies of their working premises, rational use of working time, programmes, organizational schemes, and daily activities
Analysis of vital statistics
Analysis of causes of death; proposals for reducing infant mortality
Morbidity studies; participation in measures to reduce general and specific morbidity
Participation in the analysis of methods used in pre-employment medical examinations, and methods used in the transfer of industrial workers for medical reasons
Analysis of morbidity producing temporary working disability; measures to reduce morbidity and temporary disability
Drawing up a plan for health education in a community, with particular reference to local conditions
Participation in organizing the work of health personnel in the area
Participation in socio-medical surveys and socio-medical work in the field
Evaluation of sanitary and hygiene activities in an area, making proposals for improvement.

It will be noted that considerable attention is paid to occupational health and hygiene. In order to assimilate the ideas and methods of work encountered during the part of the programme devoted to practical public health work, the students do practical work on vital and health statistics in the appropriate department; they also spend periods of practice in the
medical dispensaries of rural health districts, in tuberculosis and oncological
dispensaries, and in the welfare units of polyclinics and day nurseries.

The students carry out this practical field training in small groups of
five or so, and at the end of each phase present their observations in written
or oral form at seminars and discussions.

Postgraduate education

The postgraduate training of physicians in all subjects, including public
health and hygiene, is the responsibility of the Faculty of Postgraduate
Education and Specialization, a faculty of the Institute of Medicine and
Pharmacy, Bucharest. Training is in accordance with a plan designed to
reflect the country's needs, and is supervised by the Ministry of Health and
Social Welfare.

The other four medical schools also have departments of specialization
and postgraduate training. In addition to the specialist courses, a consider-
able number of shorter courses are organized within individual specialties
for physicians and other health workers. These may be complementary to
the specialist course, or may be intended as refresher courses. A clear
distinction is made between these short postgraduate courses and full
specialist training.

The following specialist courses are available in public health or allied
subjects:

Hygiene (9 months): for selected junior physicians.

Occupational hygiene (9 months): for physicians with at least three years’
experience as industrial physicians or as practitioners in regional or
local units.

Occupational medicine (6 months): for industrial physicians with three years’
experience in this field.

Epidemiology, control of communicable diseases (9 months): for selected
junior physicians.

Microbiology (9 months): for selected junior physicians.

Public health (9 months): for general practitioners of five years’ standing,
or specialists in other fields (internal medicine, etc.).

The curriculum for the course in public health is as follows:

Theoretical basis of social medicine

Historical development of social medicine

Influence on health of biological factors and the physical and social environment (human
genetics and heredity, physiology and physiopathology, food hygiene, hygiene of
groups of children, occupational hygiene, epidemiology, political economy, sociology,
applied psychology, communal hygiene)
Elements of the theory and methodology of statistics
Methodology of statistical research
Variation and methods of measurement
Sampling methods
Statistical analysis

Study of the health status of the population, research methods
Criteria for assessment, factors determining the health status of communities
Demographic statistics
Morbidity
Physical and mental development of the population

Protection of the population’s health; organization and administration of health protection
Historical development of health protection
Principles of health protection
Health legislation
The general system of health protection (the directing bodies, the public health specialist, the organization of public health protection in urban and rural environments; maternal and child care, the prevention and control of communicable diseases, the prevention and control of widespread chronic diseases; emergency medico-surgical care; stomatological care; balneotherapy and health resorts; physical culture and sport; the social security system; and welfare)

Methods of work in health protection
The medical and economic efficiency of health units
Health planning
Mass case-finding of diseases, follow-up procedures
Health education
Medico-social surveys
Organization of the work, financing of health units, economic and administrative problems.

The time spent on each main subject, and the form of the teaching, are shown in Table 19.

<table>
<thead>
<tr>
<th>Table 19</th>
<th>CURRICULUM OF PUBLIC HEALTH COURSE, BUCHAREST</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Subject</strong></td>
<td><strong>Hours</strong></td>
</tr>
<tr>
<td></td>
<td>Lectures</td>
</tr>
<tr>
<td>Theoretical basis of social medicine, Elements of the theory and methodology of statistics</td>
<td>78</td>
</tr>
<tr>
<td>Study of the health status of the population, research methods</td>
<td>8</td>
</tr>
<tr>
<td>Protection of the population’s health, organization and administration of health protection</td>
<td>26</td>
</tr>
<tr>
<td>Methods of work in health protection</td>
<td>82</td>
</tr>
<tr>
<td>Total</td>
<td>280</td>
</tr>
</tbody>
</table>
The specialist examinations are very difficult, and take place before a specially convened commission. It is possible, by defending an original thesis before a special commission, to obtain the degree of Doctor of Medical Sciences in a particular branch of hygiene and public health.

SPAIN

Population (1962) 31 077 104

National responsibility for health rests with the General Directorate of Health, a section of the Ministry of the Interior. Other ministries have important health functions, and activities are co-ordinated by an interministerial Committee of Health and Social Affairs, composed of the Ministers of the Interior, of National Education, of Labour, of Agriculture, and of Housing.

The country is divided into 50 provinces, excluding the African provinces. Within each province, responsibility for health matters is delegated by the Civil Governor to a provincial chief of health services, appointed by the central Government. He is in charge of a provincial health institute situated in the chief town, and of a number of secondary and primary health centres at district and local levels.

The provincial health institute is divided into sections dealing with: epidemiology, diagnostic laboratory work, dermatology and social hygiene, malaria vigilance, mental health, haematology, tuberculosis control, maternal and child health, control of chronic diseases, provincial specialist services, geriatrics, control of zoonoses, food hygiene and analysis, inspection of veterinary services, and control of narcotics.

Municipal health authorities are responsible for environmental sanitation and play a part in curative and preventive medical care. Hospitals are subordinate to the State, provinces, or communes, and a Hospital Act promulgated in 1962 provides for co-ordination and regionalization of the hospital system.

School health is the responsibility of the Ministry of National Education, but medical care for the children is provided by the health centre network. Industrial health is the responsibility of the Ministry of Labour. It is compulsory for enterprises of more than 100 workers to have an occupational health unit. In addition, extensive medical care and rehabilitation services are organized.
Social insurance covers sickness, maternity, and accidents, and extends to slightly more than 50% of the population. Non-insured poor persons are the responsibility of local authorities.

Undergraduate medical studies

There are 11 medical schools in Spain, 10 of which are faculties of State universities; the other is attached to the Free University of Navarra. The universities are responsible to the Ministry of National Education. Each faculty is administered by a Dean, who occupies a Chair in the faculty and is advised by a Faculty Board. The deans of the various faculties are ex officio members of the Governing Board of their university.

The medical curriculum is fixed by Government Decree, and is the same for all faculties.

Conditions of admission and duration of study

The condition for entry is possession of the secondary school (bachillerato) and pre-university certificates. There is no numerus clausus, and no special entrance examination.

The course lasts six years and leads to the university degree of Licenciado en Medicina y Cirugía. This degree also constitutes a licence to practise; no period of internship is required.

Teaching of public health

Proposals are being made to change the official title of the departments of hygiene and public health to departments of hygiene, preventive and social medicine. The staff in general consists of the professor, two assistant professors, a chief of practical work, and appropriate assistants.

The teaching of public health and related subjects is as follows:

<table>
<thead>
<tr>
<th>Subject</th>
<th>Year of study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microbiology and parasitology</td>
<td>2</td>
</tr>
<tr>
<td>Paediatrics and puericulture</td>
<td>5</td>
</tr>
<tr>
<td>Public health and hygiene</td>
<td>6</td>
</tr>
<tr>
<td>History of medicine</td>
<td>6</td>
</tr>
</tbody>
</table>

The course in public health and hygiene comprises three periods a week throughout the academic year, in all some 65 hours of lectures and 40 hours of discussions, tutorials, practical work, and visits. The practical section includes 6 hours devoted to epidemiological problems (communicable diseases), 6 hours spent on health and social investigations, and 15 hours of visits to the customary public health and hygiene institutions.

Although there is no uniform pattern, the teaching is broadly along the following lines:
Introduction

This covers briefly the historical development of public health and the concepts of hygiene, preventive medicine, rehabilitation, social medicine, social security and welfare, and health education.

Part I

Epidemiology and preventive medicine (36 periods)
General epidemiology of communicable diseases, modes of spread, reservoirs of infection, initial case, etc.
General preventive methods
Specific preventive methods, immunization, gammaglobulins
Disinfection, disinfestation, and insecticides
Special epidemiology and control of individual communicable diseases, classified by portal of entry
Zoonoses; tropical diseases etc.

International action against communicable disease (1 period)

Special hygiene (4 periods)
Hygiene of ships, health problems of seafarers
Military hygiene
Hygiene problems of aerial navigation, space hygiene
Climate: Spanish, tropical and polar etc.

Part II

General hygiene (19 periods)
Environmental sanitation, water supplies, sewage and garbage disposal, urban sanitation, rural sanitation
Personal hygiene and physical education
Nutrition, dietary and nutritional studies, animal and vegetable products, milk
Preservation and inspection of food etc.

Social medicine and administration (23 periods)
Concepts and history, socio-medical problems, medico-social workers
Statistical methods and their application to public health
Health and vital statistics, demography
Hereditary and genetics
Protection of vulnerable groups: children of pre-school and school age, adolescents, the elderly; mental hygiene
Control of diseases of social importance: cancer, diabetes, rheumatism, cardiovascular diseases
Control of alcoholism and drug addiction
Accident control
Invalidity and rehabilitation
Industrial health and hygiene, including diseases, industrial poisonings, control of ionizing radiation
Health administration in Spain
Social security and social assistance
Health education, methods, etc.
International health organizations.

It will be noted that considerable stress is laid on hygiene and the control of communicable diseases. Social aspects of medicine are covered in some five periods, and are also considered in discussions on vulnerable groups, etc. The social aspects of clinical medicine are dealt with by clinical teachers in accordance with their own interests; there is no joint ward teaching by the clinical departments and the departments of hygiene and public health.

Postgraduate education

Postgraduate education in public health and hygiene in Spain is organized by the National School of Public Health. This School, although part of the University of Madrid, is under the jurisdiction of the Ministry of the Interior. The Minister of the Interior is president of the School’s Governing Board, which also includes the Minister of National Education, the Director-General of Health, and the Rector of the University of Madrid.

The School has a threefold task: postgraduate education in public health, research on important public health and epidemiological problems that are of topical interest to the health authorities, and the production of biological products of public health interest.

The School provides regular courses leading to the Diploma en Sanidad (Diploma in Public Health) and to the title of Oficial Sanitario (Health Officer), and many advanced courses on special and general subjects.

Affiliated to the National School are 13 regional schools, 11 on the mainland and one each in the Balearic and Canary Islands. They give the course for the Diploma in Public Health, but not for Health Officers.

The course for the Diploma in Public Health takes up four months of theoretical and practical study. The subjects covered include:

Public health administration (20 hours, 10% practical)
General concepts of administration
Public administration in Spain
Health administration at national, provincial, and municipal levels
Health legislation
Special organizations, ports, veterinary services, international regulations.

Social medicine (92 hours, 40% practical)
Elements of medical sociology
Social factors in disease
Social diagnosis and techniques of sociological investigation
Statistical methods
Demography, vital and health statistics
Medico-social institutions, domiciliary care
Occupational health and hygiene
Social aspects of cancer, rheumatism, mental illness, alcoholism, and drug addiction
Health of special groups: schoolchildren, the elderly, invalids, etc.
Health education as a public health tool, its use against social evils
Health aspects of physical education and sport.

Environmental hygiene (24 hours, 40% practical)
Concepts
Atmospheric pollution
Housing
Water and water supplies: chlorination, fluoridation
Sewage and garbage disposal
Urban hygiene and town planning
Rural hygiene
Climate
Air and space medicine.

Epidemiology and control of communicable diseases (106 hours, 50% practical)
Etiology of communicable diseases
Infection and immunity
General epidemiology of communicable diseases, mode of spread, portal of entry, etc.
General prophylaxis, immunization, disinfection, disinfestation, etc.
Use of antibiotics and chemotherapeutic agents in preventive medicine
Control of individual communicable diseases.

Nutrition and food hygiene (42 hours, 50% practical)
Composition of foodstuffs
Dietetics
Dietary surveys
Hygiene of milk and milk products
Hygiene and control of food-processing industries
Preservation of foodstuffs.

Physico-chemical techniques applied to public health (18 hours, 75% practical)

There are no optional subjects, and no thesis is required for this diploma.
The examination is both theoretical and practical.
Candidates for the title of Health Officer must already hold the Diploma in Public Health. The course is given only at the National School in Madrid. After four months of theoretical and practical studies at the National School of Public Health, students undertake three months of practical work in the field, under the supervision of a provincial public health officer, and spend the final six months of the course preparing a research thesis. The theme of the thesis is selected by the Director of the School from three topics submitted by the student.
The theoretical part of the course is as follows:

Public health administration (24 hours, 10% practical)
Public administration, laws, decrees, administrative procedures, etc.
Financial aspects
Health administration in Spain at national, provincial, and municipal levels
Sanitary police and inspection services
Hygiene of ports, airports, etc.
International health organizations, WHO, etc.
Comparison of other health services in Europe and America
Pharmaceuticals legislation
Drugs of addiction: international conventions.

**Environmental health** (34 hours, 40% practical)
Man in his environment: atmosphere, temperature, humidity, etc.
Bacterial air contamination: sources and remedies
Atmospheric pollution
Ionizing radiation
Soil, climate
Water, urban and rural water supplies
Control of medicinal waters
Sewage and garbage disposal
Housing
Urban and rural milieus, social and health problems.

**Epidemiology** (120 hours, 50% practical)
History and general concepts
General epidemiology of infections: disease-epidemic cycles, infective agents, modes of spread, etc.
Air-borne, water-borne, and arthropod-borne infections
Natural resistance, artificial immunity
General principles of prophylaxis; antibiotics and chemotherapeutic drugs
Special epidemiology of individual communicable diseases.

**Nutrition and food hygiene** (74 hours, 50% practical)
Physiological and social importance of nutrition
Composition of foods; vitamins and mineral elements
Dietary needs: balanced diet, proteins, fats, carbohydrates
Hygiene of foodstuffs and their handling: milk, meat, fish, etc.
Alcoholic and non-alcoholic beverages
Food conservation and processing
Food additives; food-borne intoxications
Ionizing radiation and food conservation
**Codex alimentarius**

**Social medicine** (170 hours, 40% practical)
Evolution of concepts of hygiene, public health, and social medicine
Evolution of the discipline of social medicine
Medical sociology: social characteristics of the medical profession, doctor-patient relationship
Social groups: classification of social groups, relation of social groups to health
Social tensions; the family, the job
Importance of heredity
The techniques of social investigation
Statistical techniques in public health
Vital and health statistics; demography
Fundamentals of social policy; socio-medical assistance, domiciliary medical care
Organization and operation of hospitals and hospital services
Organization of social security in Spain: health insurance, accident insurance
Industrial medicine and hygiene; toxic substances in industry
Health education of the public: methods, application to families, schoolchildren, workers, etc.
Medico-social problems: tuberculosis, venereal diseases, leprosy, chronic diseases, alcoholism and drug addiction
Maternal and infant mortality
Health of schoolchildren and adolescents
Services for the elderly and for chronic invalids
Dental health
The physically and mentally handicapped
Emergencies, catastrophes, defence against nuclear attack, medico-hygienic problems of space.

SWEDEN

Population (1964) 7 621 000

The Ministry of Social Affairs is responsible for health services, social insurance, and other social services. Attached to the Ministry is a series of national Boards, including the National Board of Health (established more than 300 years ago), the National Social Board, and the National Board of Occupational Health and Safety. Most health matters, including the organization and supervision of all forms of medical care, are the responsibility of the National Board of Health, which is at present headed by a medical administrator. He and other senior officials are appointed by the King-in-Council.

In 1962 a special committee was set up by the government to examine the organization of the National Board of Health. In 1965 this committee put forward a proposal to amalgamate the National Board of Health and the National Social Board in a National Board of Health and Social Affairs. The proposal was put before Parliament in March 1967.

Responsibility for school health services rests with the Chief Medical Officer for Schools, who is employed by the National Board of Education. To ensure co-ordination, he is instructed to consult the National Board of Health on important questions concerning school health.

Sweden is divided into a number of administrative counties. In each county there is a chief medical officer, appointed by the King-in-Council, responsible under the county board of health for general supervision of all public health and medical care in the county. In rural areas the county councils employ salaried district medical officers, who are under the general supervision of the chief county medical officer. They are responsible for the medical care of people in their area and their patients are charged fees, 75% of which are recoverable from the compulsory insurance funds.
District medical officers are also responsible for maternal and child health, for school health, and for environmental health services in their areas. A proposal has been made to group two, three, or sometimes even more district health officers in bigger districts, with an ancillary staff of nurses and health inspectors. Sweden is one of the few countries in Europe with a corps of well-trained health inspectors; these inspectors are now required to have two years’ technical education.

Local authorities are responsible for hospital care and environmental sanitation, through local health boards composed of elected members. With the exception of two general hospitals in Stockholm and one in Uppsala, all hospitals are owned and operated by local government authorities. Nevertheless, the hospitals are being grouped in a highly integrated network that consists of regional hospitals with specialist and subspecialist departments, serving about one million persons, county or central hospitals with commoner specialist departments, serving some 200,000–250,000 persons, and “normal” hospitals, mainly with departments of medicine, surgery, radiology, and sometimes obstetrics, gynaecology, and paediatrics, serving some 40,000–60,000 persons. County councils and county boroughs are also responsible for psychiatric care, which is given partly inwards of general hospitals and partly in psychiatric hospitals and ancillary institutions.

Sweden has a comprehensive health insurance scheme that extends to virtually the whole of the population. Coverage includes hospital fees, about 75% of doctors’ fees, and medicines at reduced prices or free of charge for various specified diseases.

**Undergraduate medical studies**

There are at present five medical schools in Sweden. Those at Gothenburg, Lund, Umeå and Uppsala are faculties of universities; the school at Stockholm is independent. In 1965 Parliament decided to establish a sixth medical school at Linköping, and this is due to open in September 1969. All the schools are financially supported by the State, and supervised by the Ministry of Education and the office of the Chancellor of the Universities, but they enjoy autonomy in such matters as the planning of the curriculum and research. They follow the same general pattern concerning the admission of students, the curriculum and, to a large extent, the methods of instruction. Professors are appointed by the King-in-Council, through the Ministry of Education, on the recommendation of the faculty concerned.

Following a Royal Commission and extensive consultations between the Ministry and the schools, the present curriculum for undergraduate medical studies was introduced in 1955.1 This curriculum attaches great weight to

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1 A new curriculum is due to come into force shortly, but teaching in public health subjects is not radically changed. The new curriculum is described in detail in: Thyresson, N. (1968) Brit. J. med. Educ., 2, 125.
practical work; it has introduced a measure of integrated teaching, especially in the clinical years, and separates hygiene from social medicine.

At the undergraduate level teaching is carried out by the “topic” system; there is little integration in the two pre-clinical years, and the student concentrates on one or two subjects at a time. When he has completed a course and considers himself ready, he arranges with the professor concerned to take the examination; this takes place in private, only the professor and student being present. It may be written, practical, or oral, but always ends with an oral examination. This applies to all subjects, including hygiene and social medicine. This system enables students to change from one school to another during their course.

*Conditions of admission and duration of study*

Students are admitted on the basis of their results in the final secondary school examination (*studentexamen*). They must show a basic knowledge of mathematics, physics, chemistry, and biology, but can take a separate test in these subjects, outside the *studentexamen*. Applications usually outnumber vacancies by about three to one. Places go to the students with the best results in the *studentexamen*, irrespective of the subjects taken; arts students are just as welcome as science students. Some consideration is also given to courses completed in other academic fields.

The undergraduate medical course lasts six and a half years, divided into a pre-clinical period of two years and a clinical period of four and a half years. After successfully completing the pre-clinical period the student is granted the certificate of *Medicine Kandidat* (Candidate in Medicine).

The clinical period is again subdivided. The first year, known as the propediatric year, serves as an introduction to clinical work. The second stage of two and a half years is devoted at first to medicine and surgery, and later to special subjects, including hygiene, paediatrics, and social medicine. During the third stage of about one year the student works as an intern in approved non-teaching hospitals, concentrating on internal medicine, surgery and one subject of his own choice.

Special subjects, other than general medicine and surgery, may be studied in any order the student desires, but not more than one or two at the same time. An exception is that social medicine and paediatrics must be taken late in the course, and simultaneously.

After completing their studies of general medicine and surgery, students may interrupt their course for short periods to work in hospitals, or even in general practice as a *locum tenens*. This great freedom and elasticity is a feature of Swedish and some other Scandinavian courses, and many students take more than six and a half years over the course.

On completing the clinical period the student may take the final examination in medicine and surgery, leading to the degree of *Medicine Licentiat*. 
After this he may apply for registration and enter general practice immediately, although he is encouraged to complete one or more years as a hospital intern first.

Teaching of public health

The teaching of public health in Sweden is divided between a department of social medicine and a department of hygiene. Subjects in the curriculum that are related to public health are shown in Table 20.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Hours of lectures</th>
<th>Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical statistics</td>
<td>15</td>
<td>1, 2</td>
</tr>
<tr>
<td>Medical genetics</td>
<td>10</td>
<td>1, 2</td>
</tr>
<tr>
<td>Psychology</td>
<td>20</td>
<td>3, 4</td>
</tr>
<tr>
<td>Social medicine (introductory)</td>
<td>15</td>
<td>5, 6</td>
</tr>
<tr>
<td>Social medicine in connexion with other clinical subjects</td>
<td>40</td>
<td>7, 8, 9</td>
</tr>
<tr>
<td>Hygiene</td>
<td>45</td>
<td>9, 10, 11</td>
</tr>
<tr>
<td>Social medicine, with pediatrics and child psychiatry</td>
<td>55</td>
<td>9, 10, 11</td>
</tr>
<tr>
<td>War medicine (emergencies)</td>
<td>30</td>
<td>9, 10, 11</td>
</tr>
<tr>
<td>Clinical epidemiology (infectious diseases)</td>
<td>50</td>
<td>8, 10, 11</td>
</tr>
</tbody>
</table>

Social medicine. This subject, which was introduced with the new curriculum in 1955, is regarded as "dealing with the social environment of man and all those relationships of human beings to each other and to the society at large which are important in the clinical handling of a patient." 1

As in other countries where integrated teaching is practised, social medicine lends itself to collaboration with other medical disciplines. The connexion with clinical medicine is stressed in all schools, and links have been established with departments of sociology. The professors are expected to have a clinical background.

The teaching in social medicine is in three parts. In the propaedeutic year there is a short introductory course, with discussion on the taking of social case histories. This is followed by a continuing series of socio-medical case conferences, with collaboration between the clinician-in-charge, the staff of the social medicine department, and a social worker if necessary; there is considerable participation by the students who, often in small groups, may be expected to work up both the social and clinical aspects of cases, visit homes, and so on. Finally the student receives formal teaching in social medicine. Besides lectures, this teaching includes demonstrations, discussions, and practical work by students as far as possible. The subjects covered include:

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Social situation of patients
Development of the individual in a social milieu; his relations with family, school, job, society at large
The changing situation between youth and age
Vital and health statistics, stressing causes of illness and death in modern society
Prevention of chronic disease, cardiovascular and rheumatic diseases, cancer
Epidemiology of chronic and non-communicable disease
Industrial medicine and rehabilitation; the man at his job
Social problems: poverty, alcoholism, delinquency, prostitution, criminality
Laws and regulations associated with the practice of medicine
Health and social insurance, pensions, certificates.

To give an example of the importance attached to social medicine in Sweden, the Department of Social Medicine at the Karolinska Institute, Stockholm, consists of a professor, head of department, a first assistant, a second assistant, and a social worker. It is hoped eventually to establish a rural teaching area, for joint use by the Uppsala and Stockholm schools.

Hygiene. Considerable stress is laid on a full and fairly detailed course in hygiene, partly to fit the district medical officer for his combined preventive and curative duties.

The courses are fairly uniform throughout Sweden, since they are based on the same textbook. The student is expected to master the contents of this book, but the didactic teaching can be fairly elastic: it may complement or supplement the material in the textbook, and often deals with topical problems that vary from year to year.

Groups of about 30 students attend a one-month course of lectures, demonstrations, and laboratory work. The teaching is given under five main headings:

Physical factors
Chemical factors
Biological factors
Practical aspects
Organization and administration of public hygiene, including legislation.

As far as possible each student is given some practical task to carry out.

The examination includes a written paper of 10–15 short questions on topics including legislation, but students may consult copies of laws and regulations at the examination.

Postgraduate education

Committee work started in 1966 to re-organize postgraduate medical education in Sweden in accordance with recommendations made a year

1 Friberg, I. T. & Ronge, H., ed. (1964) Hygiene, Copenhagen, Munksgaard.
earlier by a special committee set up in 1963 by the governments of the four Scandinavian countries—Denmark, Finland, Norway and Sweden. A new reform of postgraduate studies may also influence undergraduate studies, as the two forms of study must be regarded as two phases of a single and coherent medical education.

In Sweden, as in other Scandinavian countries, neither hygiene nor social medicine is at present a “recognized specialty”.

Two five-week courses in environmental hygiene and social medicine are available for district medical officers. The more important postgraduate teaching is given in Gothenburg at the Scandinavian School of Public Health.

This school is a joint venture of Denmark, Finland, Norway, and Sweden. Icelandic students are also admitted to the courses. The school is attached to the University of Gothenburg, but is an independent body with a Governing Board consisting of a representative of each of the four sponsor countries.

The arrangement of the courses is unique in Europe. Each year a two-month course for medical officers is given, part of a cycle of three courses. The complete cycle of six months’ training approximates to that required for a Master’s Degree in the USA or a Diploma in Public Health in the United Kingdom. No diploma is offered at the present time, but the course is compulsory for county and some municipal medical officers in Sweden. Both nurses and veterinarians are admitted to the courses for medical officers.

In addition, there are two one-month courses in public health for qualified engineers. The spring course deals with environmental health in general, and the autumn course with water sanitation.

Courses are being developed for public health inspectors, and will eventually consist of four two-week sessions. The only course given in 1966 was on food sanitation. While these courses are mainly for public health inspectors, most of the students sent by Norway have been public health nurses.

Often the courses overlap, and the opportunity is then taken to hold joint lectures, discussions, and seminars.

The public health course for medical officers consists of the following three parts:

1) Biostatistics, epidemiology, water sanitation and food sanitation;

2) Environmental health (the relation of man to his environment, with special emphasis on occupational health, nutrition, and health education);

3) Social medicine.

Details of the course are given below:
<table>
<thead>
<tr>
<th>Part I</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Biostatistics</strong></td>
<td>58</td>
</tr>
<tr>
<td><strong>Epidemiology</strong></td>
<td></td>
</tr>
<tr>
<td>General epidemiology and methodology</td>
<td>20</td>
</tr>
<tr>
<td>Special epidemiology (hospital infections, non-communicable disease, etc.)</td>
<td>33</td>
</tr>
<tr>
<td><strong>Virology</strong></td>
<td>4</td>
</tr>
<tr>
<td><strong>Water hygiene</strong></td>
<td></td>
</tr>
<tr>
<td>General aspects</td>
<td>9</td>
</tr>
<tr>
<td>Fresh and salt waters</td>
<td>6</td>
</tr>
<tr>
<td>Water supplies and purification</td>
<td>23</td>
</tr>
<tr>
<td>Water hygiene, epidemiology, bacteriology</td>
<td>20</td>
</tr>
<tr>
<td>Waste waters</td>
<td>15</td>
</tr>
<tr>
<td><strong>Food hygiene</strong></td>
<td></td>
</tr>
<tr>
<td>Food-borne infections</td>
<td>16</td>
</tr>
<tr>
<td>Food handling and treatment</td>
<td>10</td>
</tr>
<tr>
<td>Shop hygiene and catering, including personnel hygiene</td>
<td>26</td>
</tr>
<tr>
<td><strong>Public cleansing</strong></td>
<td>3</td>
</tr>
<tr>
<td><strong>Various</strong>, including zoonoses, world food and population problems, etc.</td>
<td>14</td>
</tr>
<tr>
<td><strong>Excursions</strong></td>
<td>10</td>
</tr>
<tr>
<td><strong>Special lectures and evaluation discussion</strong></td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>250</td>
</tr>
</tbody>
</table>

| Part II                                                              |       |
| **Introduction: public health organization**                         | 9     |
| **Environmental hygiene**                                            |       |
| Indoor climate                                                       | 26    |
| Air pollution                                                        | 16    |
| Lighting                                                             | 12    |
| Noise                                                                | 10    |
| Ionizing radiation                                                   | 19    |
| Housing                                                              | 13    |
| Town and community planning                                          | 21    |
| **Occupational health**                                              |       |
| Work physiology and biotechnology                                    | 25    |
| Industrial hygiene                                                   | 30    |
| Mental hygiene in industry                                           | 8     |
| Occupational diseases and toxicology                                 | 9     |
| Accidents at work                                                    | 5     |
| Special working groups                                               | 20    |
| Accident prevention (especially children and traffic)                | 14    |
| **Nutrition**                                                        | 26    |
| **Health education**                                                 | 13    |
| **Total**                                                            | 276   |

1 The epidemiology of water-borne and food-borne diseases is dealt with under water hygiene and food hygiene respectively.
Part III

<table>
<thead>
<tr>
<th>Subject</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>General introduction (mortality, morbidity, demography)</td>
<td>21</td>
</tr>
<tr>
<td>Heredity and environment</td>
<td>18</td>
</tr>
<tr>
<td>Maternal, infant, and “toddler” health</td>
<td>29</td>
</tr>
<tr>
<td>School health, including physical and mental handicaps and school hygiene</td>
<td>35</td>
</tr>
<tr>
<td>The health of adolescents and apprentices, including such adolescent problems as alcohol, narcotics, delinquency, homosexuality</td>
<td>33</td>
</tr>
<tr>
<td>Special health problems of adults, including population studies, routine health control, special groups (working mothers, seamen, suicides)</td>
<td>38</td>
</tr>
<tr>
<td>Health problems of old age</td>
<td>20</td>
</tr>
<tr>
<td>Miscellaneous, including social policy, relations between medical and social sciences, international health and social organizations, health service policies, etc.</td>
<td>30</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>224</strong></td>
</tr>
</tbody>
</table>

It will be seen that the programme is relatively comprehensive and that in accordance with prevailing Scandinavian policy there is considerable emphasis on hygiene. On the other hand, there is less emphasis on administration, which is of great interest in some other European countries today. In general the approach to sociology and social medicine is pragmatic, and little time is spent on psychology.

Much of the teaching takes the form of didactic lectures, though questions and discussion are encouraged. In the second course, for instance, the relative times spent on different forms of teaching are:

<table>
<thead>
<tr>
<th>Activity</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures</td>
<td>161</td>
</tr>
<tr>
<td>Seminars and discussions</td>
<td>54</td>
</tr>
<tr>
<td>Excursions and demonstrations(^1)</td>
<td>55</td>
</tr>
<tr>
<td>Films</td>
<td>5</td>
</tr>
</tbody>
</table>

Since no examination is held and no diploma is awarded, students are not asked to prepare a thesis. Few or no studies are made by groups or individual students.

A very interesting feature is the discussion, analysis and evaluation that take place at the end of each course. Sometimes the participants as a whole or in separate groups submit written reports on the teaching and content. The curriculum is modified from year to year on the basis of these discussions.

Research

In Sweden there is much interest in research in public health practice, and all the medical schools and the School of Public Health in Gothenburg are engaged in various research projects of this nature.

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\(^1\) There is usually an excursion of several days, often to a Scandinavian capital.
Typical examples are studies of the amount of medical and social care provided for communities and for special groups, and studies of the socio-medical needs of special groups (disabled young persons, homeless men, old people, etc.) or community needs for special treatment, e.g., rehabilitation. There is also considerable interest in epidemiological studies of accidents. Several schools are making studies in the mental health field, including a long-term follow-up of schizophrenia cases, studying the clinical, sociopsychiatric, and genetic aspects, and epidemiological studies of narcomania and alcoholism.

The Department of Social Medicine at Lund is taking part in an international study, sponsored by WHO, on the prevalence of ischaemic heart disease. Umeå is co-operating with Lund in a similar study.

Similarly, the Department of Social Medicine at Uppsala is taking part in a collaborative international study concerning various aspects of the consumption of medical care. Finally, the Public Health School at Gothenburg is studying the medical and social aspects of human relationships in the community.

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**SWITZERLAND**

Population (1962) 5 660 000

Switzerland is a confederation, and the constituent cantons have a large degree of autonomy. Many public health matters come within the competence of the cantons.

At national level the Department of the Interior is responsible for health matters, and the Federal Public Health Service forms part of this Department. Each canton has its public health administration employing a small staff, within the cantonal government. In the larger cantons the medical officer of health is usually employed full-time, and some of the larger towns also employ full-time medical staff for public health and school health services.

Each commune is legally bound to set up a local health authority and to organize school medical services. District medical officers, usually part-time, are responsible for groups of rural communes. The large towns organize their health services on much the same lines as the cantons. Hospitals are mainly public institutions run by the cantons and large cities, and there are district hospitals in rural areas.

Much public health work, e.g., child welfare and health education of the public, is carried out by voluntary bodies.
A federal law entitles all citizens to insurance against illness. The bodies responsible are numerous mutual aid societies and cantonal or commune insurance funds. Under the federal law, the decision regarding which groups should be compulsorily insured (children, low income groups, etc.) is delegated to the cantons. This power may be delegated further to the communes. As a result, in some communes up to 96% of the population are insured, whereas in others the figure may be as low as 50%.

**Undergraduate medical studies**

The five medical schools in Switzerland are faculties of universities, institutions administered by the appropriate cantonal governments. Each faculty is headed by a Dean. There are two other universities at which preliminary studies can be made (Neuchâtel: pre-medical course, up to natural sciences examination; Fribourg: pre-medical and pre-clinical course, up to anatomy and physiology examination). Medical education is subject to federal law and regulations, and consequently the curriculum is basically the same for all schools.

The examinations, in particular, are covered by federal regulations. They are conducted under the supervision of an examining committee appointed by the Swiss Federal Council on the recommendation of the Department of the Interior. This Committee has its headquarters in Berne and maintains a local branch in each university city. In general the examinations are practical and oral, not written.

**Conditions of admission and duration of study**

Candidates must hold an officially recognized school-leaving certificate (*Maturité—Maturità*), which cannot be obtained before the age of 18. In general there is no *numerus clausus*, but the admission of foreign students (for whom special arrangements are made in Switzerland) to first-year classes may be restricted because of limited facilities.

The course lasts for six and a half years (13 semesters), and in accordance with recent regulations is divided into four periods. The pre-medical period of two semesters covers the basic sciences, including comparative morphology, and finishes with the basic sciences examination. The second period is devoted to various aspects of anatomy and physiology, includes a course in elementary biostatistics, and finishes with the examination in anatomy and physiology. Before taking this examination students must show that they have worked as a nurse in a hospital for four weeks. This can be done even before commencing the medical course or during military service. The third period covers basic clinical subjects, such as pharmacology, microbiology, pathological anatomy, and medical psychology, together with introductory medicine and surgery. It finishes with the
examination in basic clinical subjects. The final period includes the clinical subjects, preventive and social medicine, human genetics, medical jurisprudence, and the history of medicine. During this period the student must serve an internship of eight months, including one month in obstetrics.

The division of time between the later periods is somewhat elastic. The new regulations state: "Of the 13 semesters, 7 at least must have been carried out in Switzerland, 8 at least after succeeding in the anatomy and physiology examination, and 4 at least after succeeding in the examination for basic clinical subjects".1

The course finishes with the professional examination, which is taken in two parts at an interval of 1–4 months. Successful candidates with Swiss citizenship receive the Diplôme fédéral, issued by the Federal Department of the Interior, which entitles the holder to practise throughout Switzerland. Foreign students receive the Certificat de fin d'études médicales, issued by the cantonal department of education concerned, which does not give the right to enter private medical practice in Switzerland.

Teaching of public health

The federal examination regulations require study of the following subjects related to public health:

<table>
<thead>
<tr>
<th>Subject</th>
<th>No. of semesters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elementary biostatistics (possibly part of more general course)1</td>
<td>1</td>
</tr>
<tr>
<td>Microbiology, with general immunology</td>
<td>1–2</td>
</tr>
<tr>
<td>Microbiology: practical work</td>
<td>1</td>
</tr>
<tr>
<td>Medical psychology2</td>
<td>1</td>
</tr>
<tr>
<td>Social and preventive medicine (including excursions)</td>
<td>2</td>
</tr>
<tr>
<td>Epidemiology, immunology, including vaccination experience1</td>
<td>1–2</td>
</tr>
<tr>
<td>Medical jurisprudence</td>
<td>1</td>
</tr>
<tr>
<td>Medical jurisprudence (practical exercises)</td>
<td>1</td>
</tr>
<tr>
<td>Human genetics (possibly with seminar teaching)1</td>
<td>1</td>
</tr>
<tr>
<td>History of medicine2</td>
<td>1</td>
</tr>
</tbody>
</table>

The new examination regulations already mentioned use the term "social and preventive medicine" for the first time. Courses under the new regulations commenced in the summer semester of 1966, and the new examinations will be held for the first time in the spring of 1969.

For the examination in social and preventive medicine the new regulations (Art. 69) require the candidate to "reply to questions concerning social medicine and preventive medicine (occupational health, insurance medicine, epidemiology, vaccinations, environmental influences, medical assistance)". It is further laid down that 50% of the total marks will be awarded for occupational health and 50% for the other branches of the discipline.

1 Switzerland (1964) Recueil des lois fédérales, No. 52, pp. 1314-1359.
2 No separate examination is held in these subjects.
The course at the University of Geneva is described in greater detail. In 1957 it was decided to replace the Chair of Hygiene by two new Chairs, one of medical microbiology and one of preventive and social medicine.

The medical faculty in Geneva is moving towards an integrated form of instruction. The Department of Preventive and Social Medicine takes advantage of this “atmosphere” to link up with other departments, especially clinical ones.

Statistics is taught in the pre-clinical period by the head of the Department of Statistics in the Faculty of Science. The course covers a total period of 10 hours.

The course in preventive and social medicine is given during two semesters of the clinical period. The first semester is taken up mainly by didactic teaching and the second by clinico-social demonstrations, discussions, and visits. The didactic lectures are made as lively as possible, in order to catch the students’ interest and provoke them to discussion. The topics covered in the course are shown below:

**Winter semester**

**General introduction: definitions and objectives** ........................................ 1
**Epidemiology** ............................................................................................. 5
Epidemiological approach to public health
Epidemiological approach to preventive medicine
Methods and techniques
Application to illness

**Introduction to medical sociology**

The patient and society; forms of medical assistance; organization of medical care ........................................ 3
The doctor and society; evolution of medical practice (Swiss and foreign experience); manpower problems ........................................ 3

**Introduction to occupational health**

Introduction; definitions and concepts; Swiss legislation ........................................ 1
“Round-table” presentation of 3-4 concrete situations (CO, dust, toxic vapours, etc.), demonstrating the role of each team member ........................................ 4
Methods of anamnesis in industrial medicine ........................................ 1
Vocational guidance; placement in industry; rehabilitation ........................................ 1
Visits ........................................ 2

**Modern public health problems**

Introduction; air and water pollution ........................................ 5
Radioactive substances ........................................ 1
Abuse of medicaments and self-medication ........................................ 1
Role of the doctor in health education; medical information for the public ........................................ 2

**Summer semester**

**Coronary artery disease**

Demonstration of two cases that are clinically similar but socially different: presentation of case; interrogation; discussion with social workers
Tuberculosis: from case-finding to rehabilitation

Neoplastic diseases (medico-social aspects)
Two cases that are clinically similar but socially different: discussion on the role of the personal physician and the "entourage", on "telling the patient", on information and education of the public, etc.

Sports medicine
Activities of a centre, etc.
Chronic ailments in children (medico-social and genetic aspects)
Presentation of a case (e.g., mucoviscidosis)
Psychosocial and educational repercussions
Genetic counselling of parents

Health services for youth
Medico-social aspects; new activities: special cases

School health services

Diabetes
Discussion of two clinically similar but socially different cases
Mass surveys
Role of Diabetics Association

Medico-social services for the elderly
Activities of the Red Cross Social Hygiene Centre
Presentation of two families, showing the impact of chronic illness of father or mother on the families.

Each session lasts some 1½–2 hours and is conducted by the relevant clinicians, public health and social workers, and members of the Department of Preventive and Social Medicine.

At present, insurance legislation and other aspects of health insurance are covered by the Department of Surgery, but this task will eventually be taken over by the Department of Preventive and Social Medicine.

In addition to the above courses, there are proposals to organize an optional course of 2–4 weeks with a general practitioner.

In general, hygiene and environmental sanitation are regarded as subjects for postgraduate specialization.

In Zurich more emphasis is placed on hygiene, and there is greatly increasing interest in social medicine: in 1965, a voluntary 16-hour course in social medicine was attended by some 80 out of a total of 110 students. Short periods of attachment to general practitioners are also organized there.

Postgraduate education

There are no university postgraduate courses of degree or diploma level. The Institute of Social and Preventive Medicine in Zurich organizes part-time courses for public health physicians. The courses last 15 days, with six hours of work per day. The days of attendance are spread over one university semester. The aim of the courses is to give physicians a proper
orientation towards public health and the necessary knowledge for work as local health officers in cantons, districts, or communes. The following subjects are covered:

**Introduction**: objectives, discussion on the programme

**Legislation and organization of the health service**: laws and regulations; organization at federal, cantonal, and commune level; hospital planning

**Vital and health statistics**: population problems; morbidity and mortality

**Epidemiology and control of infectious diseases, bacteriological and virological diagnosis**

**Environmental health**: housing, radiation protection, water supplies, sewage and garbage disposal, air pollution and climate problems; visits

**Personal hygiene**: health education, physical exercise, and sports medicine

**Epidemiology of chronic disease**: goitre, lung cancer, cardiac infarction, accidents, legal aspects of accidents and suicides

**Social aspects**: insurance, social welfare, mother and child care, alcoholism, medical and professional rehabilitation

**Demonstrations in the Psychiatric Department**

**Other selected topics**

**Final discussion**: training of physicians in social and preventive medicine; future problems.

The lecturers are recruited partly from outside the Institute, and come from the cantonal administrations, Institute of Criminology, etc.

**Research**

Current research in Geneva consists mainly of epidemiological studies, e.g., accidental poisonings in childhood, evaluation of the results of a corrective gymnastic course in children with defects of posture, etc. In addition, the Institute of Medical Microbiology has made extensive studies on the problems of immunization in the armed forces.

In Zurich, research programmes include attempts to evaluate public health work, a study of the results of health education for young workers at a factory, a study of the results of rehabilitation of handicapped persons, a survey to assess the public's knowledge of vaccination programmes, the causes of dental caries and lung cancer, and the possibilities of preventing various chronic diseases, a prospective longitudinal study of factory workers for the purpose of early detection of coronary-prone individuals, special studies for the Cantonal Health Commission in the fields of disease prevention and health education, etc.
The national authority on health matters is the Ministry of Health and Welfare. There is a three-tier system of administration. The country is divided into 67 provinces (villayet), each administered by a provincial governor. He is advised on health matters by a director of health, responsible to the Ministry of Health. In the districts (kaza) the governor is represented by a deputy and the director of health by a district medical officer, who advises the deputy governor on all health matters and is responsible for all preventive and curative work in the district as well as for forensic medicine. His staff includes public health nurses, sanitary inspectors, and urban and rural midwives.

In the municipalities the health administration is mainly concerned with hygiene and environmental health services and with medical care for the poorer sections of the population.

In 1961 a National Health Service Act was passed, providing for the reorganization of the health services by stages over a period of 15 years. A special directorate has been set up within the Ministry to ensure that the implementation of the Act is properly co-ordinated.

Turkey has been divided into 16 health regions, each including a number of provinces. It is planned that each regional administrative centre will have a hospital of 1000 beds, a public health laboratory, and a store and repairs workshop.

In each province the Director of Health is to be responsible for all public health services. Each provincial administrative centre is to have a "health centre" with 200-300 hospital beds, and a number of special dispensaries— for tuberculosis, venereal diseases, leprosy, etc.—as required.

Locally, the health centre will be the basic unit, staffed by a general practitioner with two or three auxiliaries. Under the health centre will be the village "health station", serving 2000-2500 persons and staffed by a rural midwife.

Turkey has a social security system, and the benefits are being extended and liberalized. The medical care provided by municipal doctors and rural health centres is free, and in the large hospitals care for the needy is also free of charge.

School health is a responsibility of the Ministry of Education, and in the provinces is administered by the provincial directors of education.

The Department of Health Education and Health Statistics at the Ministry of Health is responsible for health education, and an Institute of Health Education has been set up at the School of Public Health, partly to organize courses. Health education is so essential to public health that all
medical students should be well grounded in its principles and public health officers in its practice.

**Undergraduate medical studies**

In the decade since the publication of the Grundy & Mackintosh monograph there have been great changes in Turkey. Some of the more recent developments in medical education are as exciting as any in Europe. The country now has five medical schools: the Ankara University (Cebeci) School of Medicine, the Ankara (Hacettepe) School of Medicine and Health Sciences, the Ege School of Medicine, Izmir, the Istanbul University School of Medicine, and the Atatürk University (Erzurum) School of Medicine.

Three more schools are envisaged, and one of these, Diyarbakir, is in an advanced stage of planning and will be linked with the Cebeci School in Ankara, just as Erzurum has links with the Hacettepe School.

The Hacettepe and Erzurum Schools will produce their first graduates in 1969 and 1971 respectively. Whereas the curricula of the older schools are of the traditional European pattern, the two new schools have developed advanced modern programmes, the details of which are inevitably in an experimental stage at present.

The new Turkish Constitution provides that universities shall be autonomous, and their governing bodies (Senates) elected by the staff. Their budgets are submitted to Parliament by the Minister of Education. Each faculty is a relatively independent unit, headed by a Dean. University proposals for the appointment of professors must be ratified *within one month* by the Minister of Education, the Prime Minister, and the President of the Republic. Failing this, the university’s proposals automatically become effective.

Each university establishes its own curriculum, but before graduates are authorized to practise diplomas must be registered by the Ministry of Health.

*Conditions of admission and duration of study*

Students normally enter a medical school after obtaining the Turkish certificate of secondary education. Since the number of applicants is large, candidates may be selected on the basis of their scholastic record or the results of entrance examinations. A working knowledge of a foreign language and evidence of a satisfactory state of health are also required. Admission to the Hacettepe Medical School is based on performance after two years' study at the School of Arts and Sciences.

The duration of the course is six years (or seven years at Hacettepe: two years' pre-medical studies and five years' integrated medical studies), divided into a pre-medical period of two semesters, a pre-clinical period of three semesters, and a clinical period of seven semesters.
In the older universities an examination is held at the end of each subject course and a comprehensive final examination takes place at the end of the sixth year. At the Hacettepe School there is a continuing system of appraisal, based not only on results of formal examinations but also on the student’s performance in group meetings and journal studies, his ability to think scientifically, and his ability to deal with patients and their families in the family-clinic setting.

Successful students receive the degree of Doctor of Medicine and are entitled to practise medicine in Turkey. At the Hacettepe School a bachelor’s degree in basic medical sciences is granted after four years’ study (two years of basic sciences and two years of basic medical sciences).

**Teaching of public health**

The older universities have departments of hygiene, and teaching tends to follow the old European traditions. The courses are largely didactic, although recently there has been a tendency to include more practical work and visits. Public health teaching is usually concentrated into a single year and deals mainly with the physical environment and problems of community sanitation. There is no collaboration with other faculties in the teaching of preventive or social medicine, and no particular interest in the community, apart from its sanitary aspects, or in “medicine outside the hospital”.

Istanbul and Izmir show a lively interest in statistics. At the Ankara University School of Medicine it is proposed to establish an Institute of Social Medicine, which would complement the teaching in the Department of Hygiene and cover wider aspects of public health and preventive medicine.

The curriculum at the Ege University, Izmir (Table 21) is given as an example of teaching at the older medical schools.

**TABLE 21**

<table>
<thead>
<tr>
<th>Subject</th>
<th>Hours</th>
<th>Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Theoretical</td>
<td>Practical</td>
</tr>
<tr>
<td>Microbiology</td>
<td>103</td>
<td>97</td>
</tr>
<tr>
<td>Parasitology</td>
<td>81</td>
<td>27</td>
</tr>
<tr>
<td>Hygiene</td>
<td>75</td>
<td>75</td>
</tr>
<tr>
<td>General and social paediatrics</td>
<td>16</td>
<td>—</td>
</tr>
<tr>
<td>Paediatrics and nursing</td>
<td>11</td>
<td>—</td>
</tr>
<tr>
<td>Infectious Diseases</td>
<td>22</td>
<td>—</td>
</tr>
</tbody>
</table>

The hygiene course includes the following:

_Theoretical subjects_

- Introduction to hygiene and preventive medicine
- History of public health
- Sanitation (water, food, sewage, air, housing)
Epidemiology (basic principles, infectious diseases, chronic illnesses)
Personal hygiene
Statistics (rates and ratios, demography, sampling, averages, standard deviation, error)
Occupational health
Nutrition.

Practical work
Measurement and discussion of humidity and effective temperature
Water examination (physical, chemical, bacteriological)
Water disinfection
Examination of meat, milk, and eggs
Sanitation and examination of grains, flour, and bread
The use of disinfection and disinfectants.

Visits to establishments
Water-works
Slaughterhouses
Food processing factories
Local health office
Centre for disinfection and disinfection.

The more modern programme at the Hacettepe School emphasizes two basic principles and two basic methods.

In the first place it stresses the relationship between science and medicine. Incorporated in the Medical School is the School of Arts and Sciences (commonly known as the Hacettepe School of Basic Sciences). Medical students are required to undertake two years' study in this school, and follow courses in mathematics, statistics, molecular biology and genetics, chemistry, physics, and psychology, and a special course in social sciences. Other students, including a few who will eventually study medicine, may complete a four-year programme at the School of Arts and Sciences and receive a degree in one of the sciences (cf. Ulm in Germany).

The second basic principle is the importance of community medicine. After completing his pre-medical course, the student is introduced to family care in his very first year at medical school, and this aspect of medicine runs like a thread through all his clinical training. A similar procedure is followed at the Atatürk School of Medicine, and has been described by Professor Ertugrul.1

The first basic teaching method used is “integrated” teaching (system teaching, cf. Newcastle, United Kingdom). In order to ensure the departmental co-operation that such an approach requires, the new medical school is composed of three main departments: Basic Medical Sciences, Clinical Sciences, and Community Medicine. Each main department has its own Chairman, and is divided into sub-departments and units, each headed by a professor. Although the heads of sub-departments and units

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are completely free to organize research and postgraduate training programmes in their areas, they are under the direction of the main department in matters pertaining to the organization and implementation of the undergraduate teaching programme. Teaching throughout is on a team basis, and each department makes its contribution concerning the system under study, commencing at cellular level and working up to the complete system. Sub-committees are responsible for preparing the syllabuses and supervising the teaching.

The second basic teaching method is emphasis on self-education and student participation in the teaching. Didactic lectures are as far as possible replaced by small group discussions and practical work in laboratories, clinics, and in the field. Elective periods are being introduced.

In this system of self-education there are two interesting innovations. The first is known as "journal studies". Throughout the course students meet in small groups to discuss new articles in journals chosen by a special sub-committee. Two hours each week are devoted to these exercises. Towards the end of the course students are given only the case material or experimental findings from an article, and are expected to write the discussion themselves.

The second innovation is organized student research. Students, in groups of 2–4, are given research projects that can be carried out in the multi-disciplinary student laboratories or departmental laboratories. During the final year (intern year) each student completes a thesis under the guidance of his tutor.

It will readily be observed that this system of education provides the opportunity to weave in teaching on public health and social medicine throughout the entire course. In addition, students are trained and encouraged to use the library.

The courses at Hacettepe and Erzurum are very similar, although they will be modified in the light of experience as teaching proceeds.

The two-year course at the Hacettepe School of Arts and Sciences includes teaching in biostatistics, medical psychology and social anthropology, in addition to physics, chemistry, biology, and mathematics. The five-year course at the School of Medicine is divided into three phases and a one-year internship. The teaching of subjects relevant to public health is shown below:

Phase I (one year)

Introduction to medicine (20 hours)

Public health and community medicine
Human ecology
Principles of prevention (early detection of disease, immunization, administrative problems of medical care)
Health and nutrition
Manpower problems
Population problems
Health education

Course on first aid
Community medicine (20 hours)

From the start of the course one family, which should include a pregnant woman or a newborn child, is assigned to each student. Under his instructor, the student is responsible for following up all aspects of medical care for this family, including prevention and social problems.

Students and advisers meet for two hours each week to discuss the courses. The emphasis is on community medicine.

Phase II (one year)
Epidemiology (45 hours)
18 hours of lectures
9 3-hour sessions in the laboratory

Child growth and development (25 hours)
Under the integrated teaching system, prevention is discussed by an appropriate team in connexion with the disorders of various systems.

Phase III (two years)
Community medicine (2 months)
Clerkship in a rural health centre: 1 month
Clerkship in an urban (shanty-town) centre: 1 month

Students are divided into groups of 12, and work as community doctors. There are seminars on public health, demonstrations, visits, group discussions, etc., on themes connected with community health.

Sanitation
Plans for the course in sanitation were still under discussion when this monograph was prepared. Close links with the general course in community medicine are anticipated. The students' opinions on the programme will be sought in interviews with their tutors.

Postgraduate training

The only postgraduate course in public health is given by the School of Public Health in Ankara. It is a two-year course, leading to the Diploma in Public Health. This Diploma is a necessary qualification for specialization in public health.

The School is responsible to the Ministry of Health, and is not attached to Ankara University. In teaching, however, it co-operates with the University Medical Faculty, the Gülhane Military Medical Academy, and Ministry officials, as well as with the Middle East University in the engineering aspects of the course.
In addition to the long Diploma course, the School offers a number of short courses. In 1964 these included a three-month course on rural environmental hygiene in English, for health staff from neighbouring CENTO countries. Other short courses include adaptation courses for health personnel who are to work in the areas where the National Health Service is being introduced, and various courses concerned with tuberculosis, nutrition, statistics, health education, etc.

The first year of the Diploma course is devoted to study and practical work at the School, the second year to field work and preparation of theses. Considerable importance is attached to English language studies.

The first year is divided into three stages: a 2-month full-time English language course (instruction in English continues throughout the course at a rate of 5-10 hours a week), a 2-month basic course, and a 6-month certificate course.

### Basic course

<table>
<thead>
<tr>
<th>Subject</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mental health</td>
<td>8</td>
</tr>
<tr>
<td>Mother and child health and school hygiene</td>
<td>16</td>
</tr>
<tr>
<td>Bacteriology</td>
<td>13</td>
</tr>
<tr>
<td>Nutrition</td>
<td>8</td>
</tr>
<tr>
<td>Environmental health</td>
<td>15</td>
</tr>
<tr>
<td>Epidemiology, general and special</td>
<td>26</td>
</tr>
<tr>
<td>Public health administration</td>
<td>24</td>
</tr>
<tr>
<td>Health education</td>
<td>26</td>
</tr>
<tr>
<td>Medical statistics</td>
<td>20</td>
</tr>
<tr>
<td>Campaign against tuberculosis</td>
<td>6</td>
</tr>
</tbody>
</table>

In addition there are 18 hours of seminars on various subjects, including the use of the school library and the nature of seminars, panels, symposia and open discussions, with study on the planning and running of seminars. Twenty-six hours are devoted to educational films, which cover general cultural topics as well as health matters.

### Certificate course

<table>
<thead>
<tr>
<th>Subject</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mental health</td>
<td>20</td>
</tr>
<tr>
<td>Mother and child health and school hygiene</td>
<td>30</td>
</tr>
<tr>
<td>Bacteriology (mainly practical)</td>
<td>18</td>
</tr>
<tr>
<td>Nutrition</td>
<td>25</td>
</tr>
<tr>
<td>Environmental health, with practical work and visits</td>
<td>35</td>
</tr>
<tr>
<td>Epidemiology, with an introduction to epidemiology of non-communicable disease</td>
<td>79</td>
</tr>
<tr>
<td>Genetics</td>
<td>17</td>
</tr>
<tr>
<td>Health education and community development</td>
<td>33</td>
</tr>
<tr>
<td>Public health administration</td>
<td>57</td>
</tr>
<tr>
<td>Occupational health</td>
<td>31</td>
</tr>
<tr>
<td>Mycology</td>
<td>12</td>
</tr>
<tr>
<td>Malaria</td>
<td>4</td>
</tr>
<tr>
<td>Parasitology</td>
<td>8</td>
</tr>
<tr>
<td>Health education of the public</td>
<td>29</td>
</tr>
<tr>
<td>Medical statistics</td>
<td>43</td>
</tr>
</tbody>
</table>
In addition, 109 hours are devoted to seminars on a variety of public health subjects, and 123 hours are set aside for individual work in the school library. Efforts are made to replace didactic lectures with seminars, discussion, and practical work.

The examination at the end of the first year is both written and oral, and is very comprehensive. In assessing the results, monthly reports on the student’s work are taken into consideration.

After passing this examination students work on selected subjects in the Medical Faculty, hospitals and dispensaries, laboratories, mother and child care centres, and other field institutions. At the same time they prepare their theses. Recent thesis titles include: “The value of BCG vaccination in the campaign against tuberculosis and its condition in Turkey”; “Evolution of the activities on health education from the point of view of public health”; “The diphtheria situation in Ankara in the years 1962-63 and the public health significance of the activities on this subject”; “The situation of traffic accidents in Ankara between 1962-63 and the public health significance of the activities carried out on this subject”.

Research

Research is one of the major tasks of the School of Public Health in Ankara, which acts as a research arm of the Ministry. A number of public health surveys have been carried out, including an important manpower survey undertaken jointly with the Johns Hopkins School of Public Health, Baltimore, USA. A study to develop a continuous statistical sampling survey of the population is in progress.

University departments are also starting to carry out some research on public health, as well as on technical matters. At Istanbul, for example, a study of the prevalence of dental caries and fluorosis is being conducted among 5000 primary school pupils, at Izmir some of the social factors affecting suicides in the town are being studied, and research on air pollution is being carried out at Ankara.
UNION OF SOVIET SOCIALIST REPUBLICS*

Population (1964) 227,687,000

The USSR consists of 15 national union republics and a number of other administrative and political subdivisions, such as autonomous republics, autonomous oblasts, etc. The larger republics are divided into oblasts (regions) or krais (territories), which in turn are divided into rayons (districts).

The public health services for the USSR as a whole are directed by the Ministry of Health; the Minister is a physician and a member of the Council of Ministers. Generally speaking, the Ministry is not directly responsible for the operation of the health services, but rather for supervision and advice. Direct responsibility lies with the health ministries of the constituent republics, and under them with the regional, municipal, and other local authorities, all of which have qualified physicians to run their health services. In most rural rayons, responsibility lies with the chief physician, who is at the same time medical director of the central rayon hospital. His deputy is the director of the rayon "sanepid" station. On the whole, therefore, there is local operational responsibility, subject to central technical supervision at various levels.

As an example of the operation of services at local level, the head of a large municipal health department may be responsible for:

1. Health care services: hospitals and polyclinics for adults and children, mental hospitals, physiotherapy and allied services, blood transfusion centre, first aid posts, dental services, special dispensaries and preventive clinics, district medical (general practitioner) services, etc.

2. Maternal and child welfare services: maternity homes, MCH centres, children's crèches and homes, school health services.

3. Preventive services: "sanepid" stations, isolation hospitals, disinfection and disinfection units, etc.

4. Occupational health and hygiene: factory doctor units, etc.

5. Health education, including health education centres.

6. Offices of forensic medicine.

In general, medical care is provided through a network of services based on territorial subdivisions; each unit, down to the district medical office

* See p. 42 for an account of the general principles of Soviet medicine.
or rural fielder post, has its specific territory to care for. The hospital network extends from republic, oblast, or krai hospitals, which are highly organized and offer many special services, through central rayon hospitals with fewer special services, to the peripheral local rayon hospitals. Outpatient care is provided by hospital or independent polyclinics. The district medical officers, who provide domiciliary care, are based on these polyclinics, and turn to them for first-line specialist consultation. There are separate paediatric services for children up to the age of 14, comprising paediatric district medical officers (and nurses), paediatric polyclinics, and paediatric hospitals.

Preventive services, that is to say hygiene and communicable diseases services, are provided by a network of “sanepid” stations. They are supervised by the central Hygiene and Communicable Diseases Department at the Ministry of Health of the USSR, through similar departments within the health ministries of the republics. The services are staffed by graduates of the hygiene faculties, who specialize in different branches of public health.

There is also a network of occupational health services, concerned with both preventive and curative health. One unit is provided for every 1000-2000 workers, and combines all medical services for one or more industrial undertakings, including first-aid posts, surgeries, polyclinics, hospitals, sanatoria, crèches, etc. The hygiene and safety of workplaces (including both internal hygiene and possible harmful effects on the environment, such as water or air pollution) are the responsibility of “sanepid” stations.

School health services are provided by the paediatricians and nurses of children's clinics and polyclinics, who also supervise health in the various pre-school establishments. They collaborate with the “sanepid” stations on matters of hygiene and on aspects of preventive medicine within their responsibility.

Finally, it is stressed that the health services are based on the principle of free public access to all forms of medical and preventive care.

Undergraduate medical studies

The training of physicians in the USSR is carried out in 82 institutes of medicine responsible to the Ministry of Health, and seven independent medical faculties functioning within the framework of universities.

Each institute is administered by a director. It may have as many as five faculties, i.e., faculties for training therapeutists (general medicine), paediatricians, hygiene specialists (sanitation and epidemiology), stomatologists, and pharmacists. Apart from the pharmacists, all students follow the same course for the first two years. As early as the third year there is some differentiation in the teaching, but the main differences are in the following years, when special stress is laid on subjects related to the various specialties.
Although most of the institutes are administered by the ministries of health of the republics concerned, they all follow general principles, fixed by the Central Ministries of Health and of Higher Education in Moscow, in respect of curricula, examinations, and so on.

Attendance at most lectures is compulsory, as is practical and clinical work, but certain seminars and lectures are voluntary. Students are also encouraged to devote some of their own time to subjects of special interest to them, by joining "students' scientific circles". A further feature of Soviet medical education is the selection of the ablest and keenest students to join scientific associations, where they are encouraged and helped to carry out research.

Conditions of admission and duration of study

The number of students to be admitted in any one year is decided by the ministry of health of each republic, and the final admissions plan for the whole country is determined by the Central Ministry of Health of the USSR on the basis of the republics' figures.

Candidates up to 35 years of age, who have completed 10 years of primary and secondary education, passed the matriculation examination, and possess a certificate of good health, are admitted to a competitive entrance examination. This includes written papers on Russian language and literature (or the language in which the candidate has been taught), physics, and chemistry. Some preference is given to persons who have had at least two years' practical experience since leaving secondary school, e.g., nurses and fieldshers.

The course lasts six years for each of the three categories of physician, and five years for stomatologists. Internal examinations are held at the end of each semester, and State examinations at the end of the sixth year. These State examinations are conducted by a committee appointed by the medical institute concerned, under a chairman from another institute who is appointed by the Ministry of Health of the USSR.

After passing the final State examination, graduates receive the diploma of Vrać (Physician), which entitles them to practise medicine in the USSR. For the first three years they are assigned to duty stations by the Ministry of Health of the USSR, but personal preferences are taken into account.

Teaching of public health

The courses for all categories of physician include public health subjects, and those for paediatricians and hygienists also cover special aspects of public health related to childhood and adolescence or to the work of public health doctors. In the paediatrics faculty, for instance, the course on social hygiene and public health administration covers maternal and child health and the diseases of pregnancy and childhood.
Certain aspects of training are common to all faculties. The first of these is the principle that in all subjects, whether related to the pre-clinical, clinical, or public health field, the teaching and presentation must bring out preventive and social aspects in order to produce a corps of public-health-minded physicians. Secondly, students in all faculties are required to study certain aspects of social and political economy (Table 22).

### Table 22
**Teaching of Social and Political Economy, USSR**

<table>
<thead>
<tr>
<th>Subject</th>
<th>Hours</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lectures</td>
<td></td>
<td>Seminars</td>
<td></td>
<td>Total</td>
<td>Semester</td>
</tr>
<tr>
<td>History of the Communist Party of the USSR</td>
<td>60</td>
<td></td>
<td>60</td>
<td></td>
<td>120</td>
<td>1.2</td>
</tr>
<tr>
<td>Political economy</td>
<td>50</td>
<td></td>
<td>50</td>
<td></td>
<td>100</td>
<td>3.4</td>
</tr>
<tr>
<td>Marxist-Leninist philosophy</td>
<td>80</td>
<td></td>
<td>60</td>
<td></td>
<td>140</td>
<td>4.5</td>
</tr>
<tr>
<td>Scientific communism</td>
<td>30</td>
<td></td>
<td>40</td>
<td></td>
<td>70</td>
<td>6.7</td>
</tr>
</tbody>
</table>

In the faculties of general medicine (Table 23), much of the teaching is devoted to laboratory work and field training. Of the total of 818 hours devoted to public health subjects, only 238 are taken up by formal lectures, compared with 580 devoted to laboratory or field training. Moreover, students carry out field practice in the curative and preventive services, e.g., as nurses after the third year. They work for one month in a polyclinic after the eighth semester, and for two months in a district hospital after the tenth semester. The students thus become acquainted with domiciliary medicine and with the curative-preventive and dispensary methods of work of these institutions.

### Table 23
**Subjects Related to Public Health in Faculties of General Medicine, USSR**

<table>
<thead>
<tr>
<th>Subject</th>
<th>Hours</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lectures</td>
<td>Laboratory work</td>
<td>Practical work</td>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Microbiology</td>
<td>72</td>
<td>124</td>
<td></td>
<td></td>
<td>196</td>
<td>4</td>
<td>5</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>Hygiene</td>
<td>72</td>
<td>72</td>
<td></td>
<td></td>
<td>144</td>
<td>7</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social hygiene, organization of health services and history of medicine</td>
<td>48</td>
<td>62</td>
<td></td>
<td></td>
<td>110</td>
<td>8</td>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infectious disease and epidemiology</td>
<td>32</td>
<td>160</td>
<td></td>
<td></td>
<td>192</td>
<td>9</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Therapeutic physical culture, medical supervision of physical education, and physical education</td>
<td>14</td>
<td>20</td>
<td>142</td>
<td>176</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>11</td>
</tr>
<tr>
<td>Total</td>
<td>238</td>
<td>438</td>
<td>142</td>
<td>818</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Laboratory and field practice is carried out under supervision in groups of 10, and the students are able to participate actively in the training and to discuss individual problems. Most of the practical training is carried out in the institutions of the public health services, where the students can gain first-hand knowledge of the problems they will encounter in their future work.

The content of the teaching of public health and hygiene in faculties of general medicine is shown in some detail below:

**Hygiene** (144 hours)
- Introduction, history, development, legislation, role of public, etc., organizations (Red Cross, etc.)
- Environmental factors and their effect on human health (air, soil, water, housing, food, ionizing radiation)
- Personal hygiene
- Work hygiene
- Hygiene of children and young people
- Hygiene of hospitals, institutions, etc.

**Infectious diseases and epidemiology** (192 hours)

*General epidemiology*
- History, development, methods and principles; control of epidemics in capitalist and socialist countries
- The epidemiological process, its pattern, intensity, etc.
- Causes of infection, men or animals; carriers, vectors and their classification
- Modes of spread: by water, food, and air; droplets and dust
- Resistance, immunity, natural and acquired
- Importance of social and environmental factors; effects of wars; inevitability of epidemics in capitalist societies; role of communal hygiene; prospects of eradication in the USSR
- Basic principles of prophylaxis; importance of epidemiological studies in the control of infection; isolation; protection against vectors and carriers; disinfection and disinfestation; immunizations; prophylactic habits; etc.
- Basic principles of the organization of epidemiological control in wartime; sanitary and epidemiological surveys; measures to eradicate foci of infection; disinfection of air, water, soil, and foodstuffs; individual and collective protection against bacteriological warfare; etc.

*Special epidemiology*
- Intestinal infections: bacterial, viral, helminthic and protozoal
- Respiratory infections: bacterial and viral
- Blood infections, including the rickettsioses, viral fevers, plague, malaria, etc.
- Exogenous infections, including rabies, cutaneous leishmaniasis, etc.

**Social hygiene, the organization of health protection, with history of medicine** (110 hours)

This subject covers the favourable and unfavourable effects of social factors on health. As a scientific discipline, its main task is to work out scientifically sound recommendations and practical measures for the removal or prevention of social factors harmful to health, and to make the maximum use of favourable social conditions in protecting and improving the level of public health.
Theoretical basis of Soviet health protection; Marxism-Leninism as a philosophical and theoretical background; production and living conditions as factors affecting the health of working people; interaction of social and biological factors; criticism of some theories offering a biological explanation of social factors (Malthusianism, racial theories, etc.); importance of medical biology and Pavlov's teaching in the development of prophylactic trends in Soviet health protection; role and moral stature of the Soviet physician; etc.

The main stages in the development of health protection, from pre-revolutionary Russia to the present day; health protection in phases of capitalist development in foreign countries in the nineteenth and twentieth centuries

The main methods of research in social hygiene, health statistics, and demography; methods of studying the health status of populations; morbidity statistics; physical development of the people

Organization of health protection; its basis and organs; social insurance and social security; encouragement of popular initiative in health activities

Curative and preventive services for urban populations; hospitals with polyclinics; polyclinics; district services; school, occupational, and adolescent services; organization of medical care in industrial undertakings; emergency care; sanitation and epidemiology; rural medical care; public health planning and administration

Dispensary methods of work in clinico-prophylactic institutions; special dispensaries (tuberculosis, oncological, etc.); early detection of disease and mass examinations, active follow-up; measures for improving working and family environment; collaboration of dispensaries with hospitals and polyclinics, and the use of dispensary methods by hospitals, the use of dispensary methods in specific diseases and for specific population groups

Working disability and the physician's role; assessment of working capacity; the right to work, material support for the disabled; etc.

Organization of special services: maternal and child health services, medical care in sanatoria and convalescent homes, first aid services, pharmaceutical services, sanitary and epidemiological services, etc.

Organization of sanitary and epidemiological services in rural areas; rural health units

Health education in public life, in institutions; the tasks and role of voluntary bodies, etc.

Organization of economic activities; planning the budget of the health service and its component parts

The roles of, and collaboration with, other health personnel (nurses, auxiliary staff, etc.)

In the USSR there has not been the same move towards formal "integrated" teaching as in some other European countries. However, there is some integrated teaching in the medical schools in lectures and at clinical conferences, where teachers from several disciplines discuss some common medical problem in front of the students. Clinico-pathological conferences are sometimes used in the teaching of pathology. In the case of a number of diseases, for instance, joint lectures are given by a specialist in internal medicine, a surgeon, and a radiologist, with pathologists, pharmacologists, chemotherapists, and haematologists also participating.

The teaching in faculties of hygiene (Table 24) is considered in some detail, since this is an important and unique aspect of Soviet training in public health. It must be emphasized again that the graduates of these faculties are physicians whose future life-work lies within the public health services rather than the medical care (therapeutic) services. This teaching
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TABLE 24
SUBJECTS RELATED TO PUBLIC HEALTH IN FACULTIES OF HYGIENE, USSR

<table>
<thead>
<tr>
<th>Subject</th>
<th>Lectures</th>
<th>Laboratory work</th>
<th>Practical</th>
<th>Total</th>
<th>Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microbiology, virology</td>
<td>86</td>
<td>158</td>
<td>—</td>
<td>244</td>
<td>4, 5</td>
</tr>
<tr>
<td>General hygiene, with radiation hygiene</td>
<td>80</td>
<td>88</td>
<td>—</td>
<td>188</td>
<td>5, 8, 9</td>
</tr>
<tr>
<td>Occupational diseases</td>
<td>32</td>
<td>64</td>
<td>—</td>
<td>96</td>
<td>10</td>
</tr>
<tr>
<td>Organization of health services, statistics, and history of medicine</td>
<td>80</td>
<td>130</td>
<td>—</td>
<td>210</td>
<td>9, 10, 11</td>
</tr>
<tr>
<td>Infectious diseases</td>
<td>72</td>
<td>88</td>
<td>—</td>
<td>160</td>
<td>8, 9</td>
</tr>
<tr>
<td>Communal hygiene</td>
<td>68</td>
<td>226</td>
<td>—</td>
<td>294</td>
<td>8, 9, 12</td>
</tr>
<tr>
<td>Occupational hygiene</td>
<td>80</td>
<td>230</td>
<td>—</td>
<td>310</td>
<td>9, 10, 11, 12</td>
</tr>
<tr>
<td>Food hygiene</td>
<td>70</td>
<td>170</td>
<td>—</td>
<td>240</td>
<td>7, 8, 12</td>
</tr>
<tr>
<td>Hygiene of children and young people</td>
<td>46</td>
<td>160</td>
<td>—</td>
<td>206</td>
<td>10, 11, 12</td>
</tr>
<tr>
<td>Epidemiology and parasitology</td>
<td>114</td>
<td>246</td>
<td>—</td>
<td>360</td>
<td>9, 10, 11, 12</td>
</tr>
<tr>
<td>Medical supervision in physical education</td>
<td>18</td>
<td>18</td>
<td>142</td>
<td>178</td>
<td>1, 2, 3, 4, 11</td>
</tr>
<tr>
<td>Total</td>
<td>756</td>
<td>1588</td>
<td>142</td>
<td>2486</td>
<td></td>
</tr>
</tbody>
</table>

therefore replaces the specialist postgraduate courses in general public health that are given in other countries.

From the third year onward, students specialize in hygiene. Although they still study such subjects as pathological anatomy, internal diseases, general and hospital surgery, pharmacology, gynaecology and obstetrics, and psychiatry, less time is devoted to these subjects and much more time to hygiene subjects than in faculties of general medicine. Similarly, during the clinical period, less time is spent on clinical work, and the students perform extra practical work in “sanepid” stations and as assistants to health officers.

In addition to general hygiene, considerable time is devoted to communal hygiene, occupational hygiene, food hygiene, and the hygiene of children and young people. A brief description of these parts of the course is given below:

General hygiene

Introduction: the role of hygiene and its place in the medical sciences; interaction of organism and environment; increase of resistance in the face of adverse factors; changes in environment necessary for human well-being

History of hygiene and health services, from ancient Greece to the present day in the USSR; influence of various political factors

Social factors in health: environment, food, work, fatigue, rest, physical education; basic health indices, life expectancy, morbidity

Effect of environmental factors on health: atmosphere, solar radiation, water, soil, noise and vibration, clothing, etc.
Communal hygiene

Introduction: tasks and place of communal hygiene in complex disciplines relating to hygiene

Water supplies

Environmental sanitation: soil, contamination, sewage disposal, use of waste materials, rural sanitation, disposal of corpses

Housing: planning, materials, heat, ventilation, lighting, etc.

Hygiene in public baths, hospitals, etc.

Town planning: factors influencing the siting of settlements, air pollution, green belts, satellite towns, noise, industrial wastes, etc.

Occupational hygiene

General

Introduction: scope, tasks, methods of work; biological significance of work; patterns of industrial hazard; morbidity of industrial workers; industrial hygiene and productivity

Principles of work physiology

Specific hazards: noise, vibrations, dust, poisons, meteorological conditions, ultraviolet light, ionizing radiations, electromagnetic fields of radiofrequency, etc.

Industrial factors of importance in etiology of neoplasms

Occupational injuries and safety in industry

Lighting, ventilation, etc.

Protection of women and young people

Legislation.

Specific

Basic economic branches of industry; scheme for studying their health conditions

Hygiene in various branches, e.g., mines, metallurgy, chemical industry, etc.

Agricultural production and its hazards: toxic chemicals, zoonoses, traumata, etc.

Food hygiene

Introduction: nutrition as an environmental factor, its influence on working ability and biological resistance; influence of class on nutrition in capitalist countries

Nutritional requirements: calories, proteins, vitamins, minerals, etc.

Sanitary protection and storage of foodstuffs: preservation of nutritional value; methods of preservation; storage of specific foods, e.g., fish, eggs, meat, carbohydrates, and fats, and their related hazards and hygiene requirements

Foodstuffs as vehicles of disease; personal hygiene of workers and health education of food-handlers; control of slaughter-houses, etc.

Dietetics: at home, in institutions, schools, and factories; sanitary inspection of foodstuffs.

Hygiene of children and young people

Introduction: scope and tasks; importance of health of young people; institutions concerned in protecting the health of children and young people

Physical growth

Hygienic principles in education: timetable, active rest, development of basic mental processes, memorizing, understanding, perception; polyclinic training, education in workshops and agricultural activities; prevention of injury in industry and agriculture; vocational guidance
Principles of physical education.
Food hygiene, in relation to children and young people.
Control of infection, infestation, and helminthiasis in institutions for children.
Hygienic requirements in the planning, construction, and equipment of institutions for children and young people.
Health education in institutions for young people.
Improvement and protection of the health of young people: specific health services; district health network, children's polyclinics, school physicians, role of "sanepid" stations.

The teaching is pragmatic throughout. It emphasizes on the one hand the need to change an unfavourable environment, in the widest sense, and the benefits that can flow from such change, and on the other hand the necessity for raising the resistance of the community, thoroughly educating all population groups in health matters, and fostering self-help attitudes. The repeated appeal to the lessons of history is also of interest.

Examinations in public health and hygiene subjects are held at the end of the semester in which teaching is given. Together with clinical subjects and dialectical and historical materialism, these subjects are also covered in the final State examination. From time to time, the students' knowledge is tested by means of colloquia on such topics as the organization of health protection.

Postgraduate education

It should be remembered that the graduate of a hygiene faculty in the USSR is already a trained specialist in general public health. Nevertheless, there is a well-developed system of postgraduate training for public health physicians, comprising both further specialist training in the separate branches of public health and short refresher courses. Throughout their professional life all physicians, whatever the nature of their work, have the duty and opportunity to undertake continuing professional training.

The responsibility for postgraduate training rests with the local public health administrations and the ministries of health, and the training is carried out and co-ordinated by 13 postgraduate training institutes. Each institute is headed by a Rector, and there are Pro-Rectors for training and research activities and for administration and social services. Each institute has a number of faculties, e.g., surgery, internal medicine, medical biology, sanitation and hygiene, etc. Not all institutes have the same number of faculties, but most have a department of sanitation and hygiene.

Each faculty is headed by a Dean, and has a number of professorships. Within the faculty of sanitation and hygiene, for instance, there are chairs of occupational health, communal hygiene, school health, food hygiene, epidemiology, microbiology, communicable diseases, public health administration, nutrition, medical control of physical education, etc.
In consultation with the Ministry of Health of the USSR, each institute prepares a "calendar plan" of courses for one year, including the content, dates, duration and the number of students. The specialization courses last some 3–5 months and the refresher courses 1–4 months.

Representative extracts from the 1964 “calendar plan” of the Faculty of Sanitation and Hygiene in the S.M. Kirova Institute for the Postgraduate Training of Physicians, Leningrad, are given in Table 25. Similar courses were run by the departments of industrial hygiene and occupational diseases, of microbiology (including courses for teachers of microbiology), and of infectious diseases.

<table>
<thead>
<tr>
<th>Chair</th>
<th>Course (subject or participants)</th>
<th>Number of students</th>
<th>Duration (months)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hygiene</td>
<td>Food hygiene</td>
<td>21</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Communal hygiene</td>
<td>21</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Food hygiene</td>
<td>18</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Heads of urban “sanepid” stations</td>
<td>28</td>
<td>4</td>
</tr>
<tr>
<td>Radiation hygiene</td>
<td>Radiation hygiene</td>
<td>14</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Radiation hygiene</td>
<td>14</td>
<td>3</td>
</tr>
<tr>
<td>Organization of</td>
<td>Radiation hygiene</td>
<td>21</td>
<td>3</td>
</tr>
<tr>
<td>health services</td>
<td>Heads and deputy heads of central district hospitals</td>
<td>26</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Head physicians of district hospitals and polyclinics</td>
<td>26</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Head physicians of district hospitals and polyclinics</td>
<td>30</td>
<td>1</td>
</tr>
<tr>
<td>Epidemiology</td>
<td>Head physicians of district hospitals and leaders of</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>local health departments</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Epidemiology</td>
<td>20</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Epidemiology</td>
<td>28</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Epidemiology</td>
<td>28</td>
<td>4</td>
</tr>
</tbody>
</table>

It will be noted that postgraduate courses in the organization of health services are given for heads of hospitals who are graduates of faculties of internal medicine. In addition to performing clinical and administrative duties in hospitals, they may be health directors of districts.

Some institutes (Moscow, Leningrad) run postal courses for physicians “on the job”. The physician receives written material and instructions for a practical task, on which he works in his job (for about 6–8 months). After completing this task and studying the recommended literature, he goes to the institute for 1–2 months to round off his knowledge and sit an examination. Courses of this kind cover, in particular, the administration and organization of health services. The doctor is provided with accommodation during his training period.

Besides the institutes, some of the larger sanitary and epidemiological institutions of the public health service also provide opportunities for specialization; the physicians stay there for 3–4 months under the supervision of a local specialist physician.
Hospital administration

The Moscow Institute organizes a special course, also sponsored by WHO, in hospital and health services administration. This is the Russian equivalent of the French-language course in Brussels and the English-language course formerly given in Edinburgh. The students are Soviet citizens and foreigners with a knowledge of Russian. The course lasts one academic year (9 months). The syllabus shown in Table 26 is abridged, but it is hoped that sufficient detail is given to bring out the characteristic Soviet approach.

During the 1964-65 course the students also paid a two-week visit to Czechoslovakia and Poland.

Students are required to write and defend a dissertation. Representative titles have been: “The current status of first-aid and emergency medical care in the USSR”; “Screening and follow-up as a method of curative and preventive care for an urban population, and its application in Bulgaria”; “Analysis of hospital work in the city of Lodz, Poland”; and “Aspects of rural health and hygiene in the Mongolian People’s Republic”.

On the whole, the emphasis in the course is on the organization of preventive and curative health services and the role of the hospital. Somewhat less attention is paid to the internal administration of hospitals, but this aspect is not neglected, and relevant teaching includes study of individual hospital departments and the work of their staffs, and assessment of the work of medical units.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Content</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Lectures</td>
</tr>
<tr>
<td>Medical and social services</td>
<td>Medical sociology and theory of health care</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>History of medicine and health care</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Organs for promoting health care in various countries</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>International co-operation in health care</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Legislation on health and social matters</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Social security and social insurance</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Planning and financing of health services</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Effect of economic matters on health service operation</td>
<td>12</td>
</tr>
<tr>
<td>Subject</td>
<td>Content</td>
<td>Hours</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>------------------------------------------------------------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lectures</td>
</tr>
<tr>
<td>Medical statistics</td>
<td>Methodology of health statistics investigations</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Vital and health statistics</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Hospital statistics</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>New methods and techniques in medical and health statistics</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Use of mathematical statistics in biology and medicine</td>
<td>8</td>
</tr>
<tr>
<td>Hospital administration</td>
<td>History and development of hospitals in various countries</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Theory of administration</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Hospital organization and management</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Patient services, psychology and ethics</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Organization of therapeutic and prophylactic care for urban populations, with special reference to the role and organization of the hospital</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Rural services and the role of the hospital</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Medical and hygiene services for workers; assessment of temporary disability</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>MCH services, preventive and curative</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Santorini, health resorts, and rehabilitation</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Medical and pharmaceutical supplies and services; information systems on new drugs and techniques</td>
<td>6</td>
</tr>
<tr>
<td>Construction of medical institutions</td>
<td>Planning and architecture</td>
<td>10</td>
</tr>
<tr>
<td>Preventive and epidemiological services</td>
<td>Theoretical basis and principles</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Hospital hygiene; including radiation protection, feeding, etc., Occupational health and hygiene, including agriculture</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Basic aspects of epidemiology and control of infectious diseases</td>
<td>42</td>
</tr>
<tr>
<td>Health education</td>
<td>Aims, principles, methods, and problems</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Health education in hospitals and polyclinics</td>
<td></td>
</tr>
<tr>
<td>Medical education and scientific research</td>
<td>Organization of postgraduate and specialist training of doctors and other staff</td>
<td>16</td>
</tr>
<tr>
<td>Contemporary problems and recent advances in medicine</td>
<td>Planning and organization of research</td>
<td></td>
</tr>
<tr>
<td>Examinations</td>
<td>Selected aspects, including new research methods</td>
<td>56</td>
</tr>
</tbody>
</table>

Total: 270 hours
Higher degrees

Specialists in public health subjects may study for the higher academic qualifications, "Candidate of Medical Sciences" and "Doctor of Medical Sciences"; teachers in these subjects are recruited from among physicians holding such degrees. Candidates must spend a 3-year period in an approved institute, and present and defend a thesis.

Research

The planning, development, and supervision of all aspects of medical research in the USSR require elaborate organization, which is undertaken under the guidance of departments of the Academy of Medical Sciences. The Academy's Department of Hygiene, Microbiology, and Epidemiology is responsible for co-ordinating research in the various branches of public health.

Research in various aspects of public health administration is well developed in the USSR. Many studies have been made on the organization of health services, medical manpower planning, evaluation of health services, etc. Before new administrative systems are introduced, it is common to try them out in an appropriate administrative area of the country.

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UNITED KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND

Population (mid-1966) 54,744,000

The system of health administration in the United Kingdom of Great Britain and Northern Ireland is partly two-tier, partly three-tier. The Department of Health and Social Security in London, advised by the Central Health Services Council and by standing advisory committees, has direct responsibility or general supervisory powers in respect of all aspects, curative and preventive, of the National Health Service in England and Wales. Similarly, central responsibility rests in Scotland with the Scottish Home and Health Department, and in Northern Ireland with the Ministry of Health and Social Services. The scope and intent of the services provided in England and Wales, Scotland, and Northern Ireland are largely the same, although there are some small administrative differences in matters such as
the titles of the various statutory authorities. However, these introductory paragraphs broadly apply to the United Kingdom as a whole.

Other Government departments also have important health responsibilities: the School Health Service, for instance, is the responsibility of the Department of Education and Science, and the Ministry of Housing and Local Government is responsible for water supplies, sewage disposal, public cleansing, housing bye-laws, etc. Co-ordination between departments is achieved by liaison at all levels; in addition, the Chief Medical Officer of the Department of Health and Social Security is also the Chief Medical Officer to the Department of Education and Science and to the Home Office, and advises on medical aspects of the work of other departments.

In general, the same type of organization exists at local government level, where the medical officer of health is normally school medical officer as well.

The National Health Service consists broadly of three branches: the hospital services, the general practitioner services, and the local health services. Treatment, including drugs and some appliances, is free and available to all persons ordinarily resident in the country. The public health laboratory services carry out microbiological and epidemiological work, but chemical investigation is the responsibility of the public analyst, who is appointed by the local health authority and responsible for supervising food and drugs.

The hospital service is a three-tier organization consisting of the Health Department, regional hospital boards, and hospital management committees responsible for individual hospitals. Teaching hospitals have separate boards of governors, directly responsible to the Health Department. The general practitioner services, which include family doctors, dentists, ophthalmic medical practitioners, and opticians, and the provision of drugs and medical, dental, and optical appliances, are the local responsibility of executive councils, over which the Health Department has general supervisory powers.

Public health services at local level are the responsibility of the local health authority, through its health committees. The local authority is required to appoint a medical officer of health, with such health and welfare staff as necessary. In communities of over 50,000 persons health officers must hold a Diploma of Public Health. Local health authorities are responsible for maternal and child welfare, including midwifery services, home nursing and public health nursing (health visitor service), vaccination, immunization, and prevention of illness, care and after-care of non-hospitalized sick persons, including provision of appliances, laundry services, etc., health education of the public, provision of domestic help, ambulance services, and the organization of health centres for curative and preventive services. The medical officer of health, as already stated, is normally chief school medical officer as well, and has an assistant to whom he delegates
responsibility for school medical services. He also advises other departments on environmental sanitation, and carries certain welfare responsibilities that he delegates to a chief welfare officer.

The medical officer of health, therefore, has wide responsibilities for the health and hygiene of his community and for certain aspects of medical care, but no direct responsibility for hospital or general practitioner services. He has both advisory and executive functions. Despite the present division of the National Health Service into three separate compartments, he is at the hub of things and it is in his power to exercise a wide influence on all health matters on behalf of the community. In a few areas, too, he is head of the department concerned with public health in the local medical school, and in many other areas he is associated with undergraduate teaching.

Important posts for physicians concerned with organization and administration also exist in the other branches of the National Health Service, for instance with regional hospital boards.

Industrial health services are the responsibility of the Ministry of Labour, which ensures the administration and enforcement of the Factories Acts and deals generally with matters concerning the safety, health, and welfare of workers.

The General Register Office, which administers the law relating to the registration of births, deaths, and marriages, has been active in the field of medical and other demographic statistics since its inception in 1837. It is a government department, for which the responsibility to Parliament rests with the Minister of Health. Statistics specifically relating to the National Health Service are the direct responsibility of the Statistics and Research Division of the Department of Health and Social Security.

Undergraduate medical studies

There are 21 old-established schools of medicine in England, including Cambridge, which does not undertake clinical undergraduate teaching. Twelve of these are in London, and constitute the Faculty of Medicine of the University of London. There are four schools in Scotland, one in Wales, and one in Northern Ireland. A new school of medicine attached to the University of Nottingham is to open in 1971. It is planned to introduce a new type of curriculum, with a preliminary degree course in human biology and a chair of "community medicine". All schools outside London are university faculties. The universities are autonomous bodies, independent of State control, although they receive government aid in the form of grants, through the University Grants Committee.

The administrative organs vary from one university to another, but each faculty has a Board for the consideration of its own academic affairs. The Dean, who is elected by the Board, generally remains in office until
he retires, but is sometimes appointed for a specific period. At some schools the Dean is a full-time official.

Standards for medical education are laid down in broad outline by the General Medical Council. These standards allow individual schools very considerable latitude in drawing up their curricula. For this reason the teaching varies more widely between different schools than in other European countries, and a number of interesting new and experimental curricula have recently been introduced.

Conditions of admission and duration of study

The student must pass either the entrance examination of an individual university or an alternative exempting examination. Most medical schools require applicants to pass examinations in chemistry and physics.

Because the number of applicants far exceeds the number of places, a selection process has been adopted, based upon the applicant's performance in the entrance examination, his past record, a confidential report from his school headmaster, and a personal interview, to which about one-third of the applicants are invited.

The course lasts five and a half to six years, divided into four periods: pre-medical, pre-clinical, introductory clinical, and clinical. It must be stressed that there are wide variations, but the clinical period lasts at least three years. The pre-medical period, dealing with chemistry, physics, and biology, is often taken at school before joining the university.

After passing his final university examination the student is eligible for the degrees of Bachelor of Medicine and Bachelor of Surgery. A number of non-university examining bodies also grant registrable medical qualifications. The degree of Doctor of Medicine is a postgraduate qualification obtained by writing a thesis or passing a special examination.

Newly qualified practitioners receive only a provisional registration and must serve for one year in approved posts in hospitals before receiving full registration as qualified medical practitioners.

New curricula

Some of the new and and experimental curricula are already in operation, others still exist only on paper. Four main trends seem common to them all, and each of these can be of importance in teaching public health and hygiene.

Firstly, there is a trend to link medicine more closely with the main stream of basic medical science, so placing it on a firmer scientific basis. The first three years may constitute a degree course in human biology or, as in Edinburgh, in medical sciences only. This parallels Russian thinking on the science of medicine. A thorough study of human ecology as a biological phenomenon will condition the student to observing and understanding the effects of the sanitary and social environment on his patients,
and this will assist him in disentangling what Payne\(^1\) describes as "mechanisms" from "causes". It is generally accepted that social and other behavioural sciences should be included in human biology, and there is a discernible trend towards increasing the time devoted to these subjects in the curriculum.

Secondly, there is a holistic approach to the teaching of medicine. As far as possible teaching will be given on a "topic" or "system" basis (see note on the new school at Ulm, p. 91), whereby "systems" rather than "regions" will be presented to the student (Stage I syllabus, Newcastle upon Tyne). Such an approach by a team of teachers can give many opportunities to introduce social and environmental facts into clinical teaching.

Thirdly, there is increasing interest in "medicine outside the hospital". This is in many places aided by deliberate attempts to ensure that the teaching hospital acts as a "community" hospital, not merely as the last court of appeal for rare, difficult, or complicated cases drawn from the entire country. Frequently the teaching deals with general practice. Edinburgh has a chair of general practice, and Guy's Hospital Medical School in London is establishing its own general practice unit within a circumscribed area. The aim is not to teach the mechanics of general practice, but rather to make the student realize that his patient is not just a present "case", but a human being with a past and a future, and to show him something of the environment in which the patient has lived and will live. In other words, general practice medicine can be a laboratory for the study of public health and social medicine.

Finally, there is an attempt to liberalize the medical curriculum (and incidentally the rather formidable British examination system) by giving the student more time to pursue his own medical interests. This is achieved by giving him more free time and by a system of elective studies. If good students are willing to choose social medicine as an optional subject, this can have a decisive effect on their future careers and on the country's public health services. Another aspect of liberalization is the growth of active participation by students in the teaching process, through seminars, panel groups, and other forms of discussion, whereby students themselves prepare and introduce the subjects.

Teaching of public health

The recommendations of the General Medical Council, the body responsible for the licensing of medical practitioners, include the following points:

"Social and Preventive Medicine. The teaching should include systematic instruction and demonstration in the community aspects of medicine and

its responsibilities; the epidemiology and the demographic, social and environmental associations of disease; and the organization of medical care and policies for the prevention of disease and the promotion of health. It is desirable that some of these aspects should be integrated in the teaching of other clinical subjects.

"In all clinical subjects the student should study the influence of heredity on health and disease, both in terms of the individual and of the population as a whole."\(^1\)

In dealing with medical schools in the United Kingdom, Grundy & Mackintosh make a clear distinction between the "London" schools and schools outside London: "There is no separate department of social and preventive medicine in any of the London schools."\(^2\) This is no longer entirely true: a Chair of Social Medicine has been established in one school, in conjunction with the Medical Research Council's Social Medicine Research Unit, and additional chairs will probably be established shortly in one or two other schools.

There are wide variations between one school and another in the sections of the curriculum dealing with public health and social medicine.\(^1\) Nevertheless, certain trends can again be observed.

Firstly, it is widely agreed that the detailed methods of hygiene and public health practice are matters for postgraduate, not undergraduate, study (cf. surgery). Students should be taught principles; techniques, except for epidemiological and other widely applicable techniques, should be left until a later stage.

Consequently, teaching in hygiene in particular tends to be much less formal and systematized than in most other European countries. For instance, the student may well learn all he needs to know about air pollution when discussing the epidemiology of chronic lung disease, or about water pollution when discussing enteric infections, and may receive no formal lectures on these subjects at all.

The question remains, what should the student be taught? Present-day thinking in the United Kingdom has been summed up by Professor J.N. Morris (personal communication) in a way that would probably receive wide agreement. He suggests the following scheme:

**Pre-clinical period:**
(a) Statistics
(b) Behavioural sciences

**Clinical period:**
(a) Social aspects of clinical medicine (taught jointly with clinical teachers)
(b) Community health and health services
(c) Epidemiology.

\(^1\) General Medical Council (1967) *Recommendations as to basic medical education*, London (Recommendations 21 and 32).

In some schools outside London the curriculum is more systematic, with more emphasis on environmental hygiene.

The Royal College of Physicians\textsuperscript{4} takes a somewhat different line. It stresses that the teaching of social aspects of clinical medicine should be the responsibility of clinical teachers, but concedes that teachers of social medicine have a contribution to make. This contribution is not inconsistent with the discipline of social medicine, but should not be regarded as the focus of social medical teaching. Academic social medicine is seen by the Royal College of Physicians as comprising (1) epidemiology, and (2) the study of the medical needs of society, both considered in a very wide sense.

As a further example of current thinking, the Royal Commission on Medical Education has recommended\textsuperscript{2} the inclusion in the curriculum of such subjects as statistics, behavioural sciences, sex education, general practice, and community medicine.

To illustrate the undergraduate teaching of public health in the United Kingdom, the courses at one London medical school and at one school outside London are considered in detail.

At St Thomas's Hospital Medical School, London, about 50% of the students come only for the clinical stage of the curriculum, having taken their pre-clinical studies elsewhere, mainly at Oxford or Cambridge. For this reason there is no organized teaching of public health subjects at the pre-clinical stage, although some students may have been introduced to statistics in connexion with one or other of the pre-clinical sciences.

The course in public health is not compulsory, and there is no examination, although a question may eventually be included in the internal hospital examinations.\textsuperscript{3} The staff of the Department of Social Medicine consists of a Reader, a Lecturer, and an Assistant Lecturer who is also a social worker. The teaching extends throughout the clinical period.

<table>
<thead>
<tr>
<th>Introductory clinical period</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement in medicine: 6 two-hour periods</td>
<td>12</td>
</tr>
<tr>
<td>Introductory course: 6 two-hour seminars, dealing with the concepts of social medicine, epidemiology, community care, occupational health, health service functions, and administration</td>
<td>12</td>
</tr>
</tbody>
</table>

\textsuperscript{1} This wide variation between different schools is described in more detail in: Macsween, R. N. M. (1959) Report on the teaching of social medicine in British medical schools, British Medical Students Association. However, there have been many changes since 1959, and these are summed up in: Royal College of Physicians of London (1966) Report on departments of social and preventive medicine, London.


\textsuperscript{3} At some schools, e.g., London Hospital Medical College, questions on public health are regularly included in the final examinations.
First clinical year

**Weekly ward round** .................................................. 15–18
Teaching centres round the problems of individual patients, with emphasis in
discussion on the etiology, total management, social factors, epidemiology,
environmental aspects, and natural history of commoner clinical conditions.
The history, etc., of each patient studied is introduced by the student "attached" to
the patient.

**Visits** ................................................................. 4–6
Three afternoon visits are arranged, covering care of the chronically sick and dying,
rehabilitation, and industrial conditions.

**Geriatric medicine**
Students are attached to a geriatric hospital for one week at a time. Domiciliary
visits are included.

**Epidemiology** .......................................................... 8
Two lectures are devoted to epidemiological methods, and the remaining six to
groups of communicable and non-communicable disease: coronary artery disease,
chronic bronchitis, cancer and leukaemia, acute respiratory disease, food poison-
ing, enteritis and dysentery, and other viral diseases.

Second clinical year

**Family attachment** .................................................... 12–15
During the obstetrics course, each student is attached to a family in which the wife
is due for confinement at the hospital. The student performs the delivery and pays
two visits to the family, one before the birth and one when the baby is three months
old. The student also has two "short cases", which he selects himself from among
his own deliveries. He visits each woman once between her discharge from the ward
and her attendance at the post-natal clinic. After each visit, the student records
selected items of medical and social information on interview records.

The family attachment programme is designed to encourage the students
to consider patients in relation to their environment and to recognize
factors relevant to preventive and therapeutic medicine. "A further
objective of the scheme is to show the student how a series of individual
observations can be built up to provide a picture of a group".1

During this period some four seminars are organized; a first briefing
seminar explaining the objectives and procedures; a second, after the first
home visits, at which the records are discussed; a meeting with staff from
the local authority health department, in the form of a case demonstration
of one of the families; and a final meeting at which students in pairs or
small groups present the findings and analyses of data collected to the staff of
the Departments of Social Medicine and Gynaecology. The data
collected can be cumulative over the years, so that eventually a large mass of
facts can be considered in connexion with such questions as family size

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and contraceptive practice by social class, complications in babies associated with mothers' attitudes towards pregnancy, etc.

An objective evaluation of the scheme revealed "a real difference between the ability of participants and non-participants to recognize factual information relevant to the social aspects of obstetrics and infant care." 1

Third clinical year

General social medicine .......................... 8-12
Lectures by visiting teachers on such subjects as: hospital organization, disease, occupation and medicine (3 hours); filing of a death certificate, community needs, demands, and services (2 hours); the Ministry of Health and medical practitioners; the family, the home and general practice (2 hours); integrated medical care for the patient.

Visit to a coal-mine

Microbiology ....................................... 80

Bacteriology includes (1) general bacteriology, including morphology, sterilization, bacterial genetics, epidemiology and antibiotics; (2) systematic bacteriology, covering all bacteria of clinical importance in the western hemisphere; and (3) clinical bacteriology, e.g., meningitis.

Immunology includes non-specific immunity, antibodies, cellular immunity, antigens, theories of antibody production and immunity, antigen/antibody reaction, anaphylaxis and allied phenomena, immunological tolerance and autoimmune disease, practical immunization procedures.

Virology includes rickettsial and pneumococcal-like organisms. It covers general features and methods of study, systematic virology, clinical and diagnostic virology, interferon, electron microscopy, and oncogenic viruses.

The School is planning to extend studies in "medicine outside the hospital." It is working with a group practice in a nearby area, and it is hoped that eventually each student will spend a week working with the practitioners.

Finally, students may elect to spend a period of one to two weeks assessing specific problems, such as the care of old people, the functioning of local health authorities in relation to hospital services, etc. Some 10-12% of students take part in an elective study. In addition, one or two students each year undertake research projects in the Department, e.g., hypothermia in old people, or respiratory symptoms and lung function in students in relation to smoking habits.

Other London hospitals are developing the teaching of social medicine on somewhat similar lines. One interesting scheme at the London Hospital Medical College is an analysis of a number of factors concerning each patient discharged from the medical teaching unit. This is based on a questionnaire filled in by the student attached to the patient, dealing with such matters as the reason for admission, what was achieved by admission,

what light was cast on the case by relatives and friends and by knowledge of family, home, and work, what the patient was most concerned about in hospital, the student's contribution in the case, why the patient had this illness, and why he had it at this particular time, the prognosis, and so on.

At Belfast in Northern Ireland there is a family attachment scheme very similar to that described at St Thomas's Hospital.

The Newcastle upon Tyne Medical School has recently introduced a new curriculum, the main principle of which is to provide the student with a simpler and more logical view of the study of medicine and to make him think for himself more. As far as possible, the course of study is covered in an integrated form, and the traditional teaching of subjects on a departmental basis is replaced by studies, based on the systems of the body, to which various departments make their contributions.

The former pre-clinical and clinical stages are replaced by four new stages, covering five academic years:

Stage I

Four terms concerned with the study of human structure, function, development and growth, psychology, and social relationships. Teaching is almost completely confined to a single integrated course, in which "systems" rather than "regions" are covered.

Stage II

Two terms devoted to introductory and general aspects of pathology, microbiology, clinical biochemistry, pharmacology, environmental medicine, and biostatistics.

Stage III

Approximately six terms (two years) of clinical studies in the hospital wards in the mornings, and integrated instruction on the systems of the body in the afternoons. The relevant anatomy and physiology is revised, and teachers of other disciplines make their contribution to the current subject, sometimes in symposia or conferences.

Stage IV

This extends over the last year of the course. There is no longer any systematic instruction, but the student is attached to hospital wards for prescribed periods and takes a responsible part in the work of the ward or department.

A one-month period during this stage is devoted to an approved elective subject. This time may be spent in a general practice. Some students are selected to undertake special study topics and to engage in clinical or experimental inquiry.

The Head of the Department of Public Health serves on a part-time basis, as he is also Medical Officer of Health of the City of Newcastle upon Tyne. He is assisted by a full-time lecturer, and many of the staff of the City Health Department share in the teaching. This direct link between the City Health Department and the Medical School is still retained by four schools outside London.

Naturally, the Department of Public Health shares in much of the joint "system" teaching as well as giving its own more formal courses. In considering certain specific infections, for instance, the team of teachers
will include not only a physician, a microbiologist, a paediatrician, etc., but also a public health physician and even a public health engineer. A sociologist takes part in the teaching on some aspects of nutritional deficiency. Similarly, an industrial health physician joins the teaching team for many subjects.

Paediatrics, as in a number of other British schools, is the responsibility of a Chair of Child Health. Consequently, teaching tends to range widely over the public health and preventive aspects of paediatrics, and Newcastle has a long and pioneering tradition in this field.

Clearly, therefore, much of the teaching of public health and hygiene is so fully integrated with general teaching that it is very difficult to specify how many hours are spent on this or that aspect of the subject.

**Stage I**

*The study of human social relations*  
*Hours*

<table>
<thead>
<tr>
<th>Topic</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>The origin and development of human society; contemporary society and its relation to health</td>
<td>16</td>
</tr>
<tr>
<td>Visits to medico-social institutions</td>
<td>4</td>
</tr>
</tbody>
</table>

**Nutrition**

<table>
<thead>
<tr>
<th>Topic</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physiological aspects of nutrition</td>
<td>12</td>
</tr>
<tr>
<td>Dietetics, including the dietary condition of the population</td>
<td>5</td>
</tr>
</tbody>
</table>

**Psychology**

<table>
<thead>
<tr>
<th>Topic</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures, including the growth and development of human personality, learning and conditioning, mental mechanisms in everyday life</td>
<td>8</td>
</tr>
<tr>
<td>Practical work</td>
<td>12</td>
</tr>
</tbody>
</table>

**Stage II**

*Environmental medicine and biostatistics*

This is taught by members of the Department of Industrial Health. Environmental medicine is a course of 18 hours, mainly covering the working environment. It aims to teach students to realize the importance of the working environment, and to understand that an environment that fails to meet certain criteria will affect the worker’s health and result in a clinical disorder. The course is illustrated by describing a number of specific environments (dust, noise, heat, solvents, gases, etc., ionizing radiation), showing how they lead to illness if unchecked. Instruction includes the organization of environmental services and the taking of occupational histories. Field visits and lecture demonstrations are given in Stage III.

Environmental medicine is a course of 10–12 hours that runs through all three Stages. It is at all times as practical as possible, and linked with the work the student is doing at the time in physiology, pharmacology, occupational health, or communicable diseases. It includes a lecture on “Design and analysis in therapeutic trials”. The course is described in more detail on page 29.

**Stage III**

*Family and community medicine*

This joint course occupies four mornings a week for a continuous period of four weeks. At the end of this period an interesting attempt to evaluate the course is made.
Students are asked to fill in a questionnaire anonymously. The questions include a five-point rating of each course from “excellent” to “very poor”. The students are asked to indicate which parts of each course were “most enjoyable” and “least enjoyable”, and finally what improvements they could suggest for the future. This type of course evaluation by students, not uncommon in the United Kingdom, is comparatively rare elsewhere in Europe.

(a) Family medicine (28 hours)

During this course the student studies the impact of disease on the family, and the services designed to meet these situations, including statutory and voluntary agencies.

Naturally the course also has important clinical aspects, illustrating “medicine outside the hospital”. Students, in pairs, spend two mornings a week with a selected family doctor, both in his surgery and on home visits. In view of the size of the subject and the limited time available, the students are given a number of broad headings under which to group and record their experiences. These are:

1. Measures concerned with the maintenance of family health and well-being
2. Common illnesses dealt with entirely by the family doctor
3. The acute medical or surgical emergency
4. Chronic and disabling illness
5. Illnesses that required referral to hospital, or illustrated the relationship between family doctor and specialist.

Students are also asked to concentrate on a number of symptoms or special problems, including “headache”, “rashes”, and “preventive advice”.

At the start of the course, each student is allotted one family for deeper study. These families are chosen to illustrate some common situation, e.g., a young couple expecting their first child, a family with a chronically sick or disabled member, an old person living alone, etc.

Each student keeps a diary of his experiences, and the course is terminated by a seminar at which one student presents the situation affecting his allotted family; he speaks for some 10 minutes, and discussion follows. In the second half of the seminar, one student speaks on a selected symptom, illustrating his talk by presenting one or more patients he has seen.

(b) Community medicine (28 hours)

This course occupies the remaining two mornings a week for four consecutive weeks. The first hour is taken up by an informal lecture, and this is followed by visits and demonstrations. The students work in groups of 12. The programme is as follows:

   Demonstration: films, education material, etc.
Day 2. Lecture: domiciliary staff, their training and duties
   Visit: with a district nurse
Day 3. Lecture: national health insurance, national assistance
   Visit: to an old people’s home
Day 4. Lecture: local authority child health services
   Visit: to a school clinic or school for handicapped children
Day 5. Lecture: mental health services and their application in the community
   Visit: with a psychiatric social worker or mental welfare officer
Day 6. Lecture: environmental control (housing, nuisances, smoke control, noise)
   Visit: with a public health inspector
Day 7. Lecture: voluntary organizations, their role in community care  
Visit: with a health visitor

Day 8. Lecture: notification and certification; final discussion with Medical Officer of Health.  
Visit: to an industrial rehabilitation unit

This course is conducted in an informal tutorial manner, and students are encouraged to participate and ask questions.

Social and preventive medicine (12 lectures)  
History of public health and social medicine  
Epidemiology: patterns of population structure, trends, morbidity, mortality  
Social obstetrics  
Social paediatrics  
Social and medical problems of the adolescent: illegitimacy, venereal disease, care of unmarried mothers, etc.  
Problems of parenthood, human relationships, family planning, etc.  
Environmental hazards  
Epidemiology and prevention of accidents: at home, on the roads, at work  
Primary prevention: coronary thrombosis, bronchitis, lung cancer, etc.  
Secondary prevention: early diagnosis, screening procedures, etc.  
Environmental control: food, air, water, housing, space  
Medicine in society: local and worldwide patterns of medical care; future development.

At the end of Stage III students sit a general theoretical examination, consisting of multiple choice questions, essay papers, and oral examinations. Questions on public health and on social and preventive medicine may be included in both sets of written papers, and an internal and an external examiner in preventive medicine take part in the oral examination.

Diversity is a feature of British teaching today, but space does not permit a description of the many other interesting courses in British schools. However, the optional course at Edinburgh on "Psychology and sociology in relation to medicine" should be briefly mentioned. It is held during the three terms of the pre-clinical year, and occupies some five hours a week: two 1-hour lectures, a 1-hour discussion or tutorial group, and a 2-hour practical class. Classes are conducted with a minimum of formality, and much questioning and discussion are permitted.

Postgraduate education

Postgraduate teaching is given by three schools or institutes and a number of university departments. The three special institutes are: the London School of Hygiene and Tropical Medicine (attached to the University of London), the Royal Institute of Hygiene and Public Health, London, and the Usher Institute for Public Health, Edinburgh (attached to the University of Edinburgh as its Department of Public Health).

Other university departments giving postgraduate courses are at Aberdeen, Bristol, Cardiff, Dundee (University of St Andrews), Glasgow,
Leeds, Liverpool, Manchester, Newcastle upon Tyne, and Belfast (Queen’s University).

The courses leading to the Diploma in Public Health are mainly full-time and last one academic year, but the Royal Institute of Public Health and Hygiene and some of the universities offer part-time courses spread over two years. The total teaching time is the same in both cases.

In conformity with section 48 of the Medical Act, 1956, the General Medical Council from time to time makes “Rules prescribing such minimum courses of study as are in their judgement necessary” for those wishing to obtain a registrable diploma or degree in public health, which confers certain “special privileges with respect to the tenure of posts of Medical Officer of Health”.

The present rules were adopted in 1955 and modified on 24 May 1960. They are to be regarded as minimum requirements, and any licensing or teaching body may require students to have extra instruction and take additional examinations. These rules are much more detailed than those dealing with undergraduate teaching. New rules are under consideration and may be issued in the near future.

In the United Kingdom it may fairly be said that opinion as to what a future medical officer of health should be taught is “in the melting pot”. The two main schools of public health, at London and Edinburgh, have both adopted new curricula recently, and the curriculum at Edinburgh has not yet been formally approved by the General Medical Council as meeting the requirements for a registrable qualification in public health.

There are two major points of interest. First of all, it has been accepted for a number of years that there is no need to teach public health students the detailed techniques of subjects that are now the responsibility of specialists, such as bacteriology, chemistry, and public health engineering. Instead, they should be thoroughly grounded in the principles of these subjects and concentrate more on techniques that can be generally applied in their technical and administrative work and in everyday decision-making, such as statistical and epidemiological techniques. This swing away from the technical aspects of hygiene has been accompanied by greater emphasis on social and behavioural sciences.

The second point is the increasing demand for deeper instruction in the methods and techniques of administration. However, although it is unanimously agreed that health officers need more instruction in administrative techniques, there is no agreement as to how this should be done. Broadly there are two schools of thought. One believes that it can be achieved by modifying the present course for the Diploma of Public Health: the new course at Edinburgh (see p. 230) is a step in this direction. The other school of thought believes that a modified course would not provide adequate

instruction, particularly for senior public health posts, and in general it advocates at least a two-year course, partly academic and partly in the form of in-service training. A report\(^1\) published by the Royal College of Physicians sums up the requirements for this advanced course as including “the workings of government and power structure, the machinery of decision making, the history and organization of the social and medical services, statistics and economics, epidemiology, communications theory and practice, management practice including finance, as well as some of the traditional public health subjects”.

**New curricula**

Until the academic year 1967-68, the London School of Hygiene and Tropical Medicine conducted annual courses leading to a Diploma in Public Health. During recent years the School has tried to adapt this course to meet changing needs, but in the light of its experience has now found it necessary to introduce an entirely new course.

The new course leads to the degree of Master of Science in the Faculty of Medicine. Candidates are required to attend a full-time course of studies at the School for one year, followed by a year of practical work approved by the University.

The course is of a type quite new to western Europe, although it conforms to the trend noted on page 40 towards courses combining theoretical and practical instruction, supervised and guided by a single authority.

It aims to provide a common postgraduate training for doctors wishing to specialize in social medicine and follow careers either in medical administration or in research and teaching. With common training, it will be possible for doctors in medical administration to move from one branch of the health services to another and easier for them to interchange with academic appointments.

The curriculum and instruction are concerned with basic subjects and there is little vocational emphasis, except on specialization in social medicine.

The subject-matter of the course can be considered at three levels: (1) medicine, sociology, and statistics; (2) developing out of the first level, epidemiology, management, and operational research; and (3) the application of these subjects to the study of community health and the organization of all aspects of medical care.

The course is designed for persons who hold a medical qualification and have had good clinical experience. The teaching methods include the use of lectures, seminars on selected subjects and current problems, practical classes and projects to train students in techniques and problem-solving, and tutorials where the student is given guidance and his essays and personal

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\(^1\) Committee on Medical Administration (1966) Report, London, Royal College of Physicians.
study are discussed. A central feature is the weekly session of “topic” teaching, which aims to integrate the physical, biological, social, and psychological aspects of major issues in hygiene, preventive medicine, and medical care, and to relate theory and practice. These sessions are attended by first-year students, by second-year (practical) students as far as possible, and by all the full-time staff of the School’s Department of Public Health.

The curriculum is as follows:

**Medicine and human biology**
Application of medical knowledge to hygiene (i.e., the promotion of health), preventive medicine, and the organization of medical care

*Note:* Much of this ground is covered in the weekly sessions of “topic” teaching. It is assumed that students are already acquainted with the basic medical sciences, so that it will only be necessary to introduce relevant recent advances. However, two areas of particular importance are at present inadequately covered in many undergraduate curricula, and require some hours of formal teaching:

(a) Genetics, with special reference to populations
(b) Growth, development and aging.

**Social and behavioural sciences**
Social conditions of the community: living standards; housing; family structure; education; employment; social effects of illness; social deviation

Behaviour in relation to health and disease; social, cultural, and individual psychological factors in illness and disability and in the use of health services; conforming and deviant behaviour; modification of behaviour patterns; family relationships; family and community responsibilities for the sick

Theory of organization; systems of government; organizational structure; sociology of professions; inter-professional relationships; relationships between professions and the public; dynamics of social change; theory and practice of communication; medical ethics

Health and social service economics and their relation to national investment

**Statistics**
Methods; data processing; use of computers
Demography and vital statistics; social statistics
Appreciation of operational research methods

**Epidemiology**
Principles and methods of epidemiology
Sources of information; design of Investigations (with special reference to health services)
Epidemiology of non-communicable diseases
Epidemiology of communicable diseases
Experimental epidemiology—field trials and action research

**Principles of administration and management**
Comparative organizational structures; committee organization; communications; personnel
Planning and decision-making; theory of games and decisions
Quantitative methods in management; resources allocation; cost effectiveness; cost-benefit analysis; operational research; systems analysis; theoretical models; management controls; problem of determining controllable and uncontrollable variables; management accounting; budgeting

Medical administration
The public services—their development, organization, financial and administrative control—with special reference to health and other social services; voluntary services; international comparisons of health and social services
Principles of planning, provision, deployment, and evaluation of services for the promotion of physical and mental health, the prevention of disease, and the comprehensive care of the sick and injured; inter-relationships of health and social services; social and medical change

The year of practical instruction comprises:

1. Exercises in the solution of epidemiological, operational research, and management problems, and in the preparation of memoranda containing information and statistical data.

2. Observation of the work of local and central health departments, hospital boards, general practices, and other relevant places and institutions.

3. At least nine months' full-time attendance at an academic, health or social service research unit, under the supervision of a preceptor approved by the School, in order to acquire experience and expertise in the application of the relevant range of epidemiological and operational research skills to the planning, management, and evaluation of health services.

The examination includes three written papers taken at the end of the first year or, if approved, after the second year. All three papers must be taken on the same occasion.

In addition, an oral examination is held at the end of the second year. At the same time, every candidate is required to present a detailed written report on the practical work carried out under (3) above.

The new curriculum at the Usher Institute for Public Health, Edinburgh, leads to a Diploma in Social Medicine. This replaces earlier diploma courses in public health and in medical services administration. It is hoped that the new Diploma will shortly be recognized by the General Medical Council as a registrable qualification in public health. The curriculum is included here as an example of a one-year course designed to provide increased instruction in administration for doctors working in the public health field. It consists of lectures, seminars, visits to appropriate health care agencies, and practical instruction and exercises undertaken in groups and individually.
Part 1. The community, the distribution of disease within it, and the agencies for controlling disease

*Social and cultural factors in relation to health and medical care* (34 hours): Introduction to the behavioural sciences; social and cultural factors in disease etiology; beliefs, values, and attitudes in relation to medical care; impact of illness on families; medical care settings; factors influencing use of health services.

*Host, agent and environment* (45 hours): Refresher course on human heredity, microbiology, chemical agents, nutrition, physical agents (heat, noise, etc.), and their interactions in relation to health and disease.

*The health care professions* (10 hours): Sociology of the health professions; the functions of the respective professions and their relationships; training; manpower planning.

*Health service organizations* (10 hours): Organizations concerned with health and welfare in Britain; international comparison of organizations in health and welfare.

*Demography, vital statistics, elementary statistical theory, principles of epidemiology* (82 hours): Lectures, practical work and seminars covering (a) national statistics and demographic concepts, (b) statistical theory and application in epidemiology and medical care studies, (c) principles and techniques of epidemiology in the study of communicable and non-communicable diseases.

Part 2. Techniques used in solving health problems, and their application

*Control of communicable diseases* (26 hours): Seminars on the epidemiology and methodology of preventing tuberculosis, malaria, smallpox, and other selected communicable diseases.

*Control of non-communicable diseases* (48 hours): Seminars on the epidemiology and methodology of prevention and control of selected non-communicable diseases, and on health hazards and their control.

*Organization theory, economics and finance* (10 hours): The organization as an instrument of policy-making and decision-making, as an instrument for action, and as a social group; the economic system, national accounting, budgeting, financial control, costing principles.

*Systems design* (35 hours): Work study methods, operational research techniques, simulation, use of computers, the planning of patient care systems and of diagnostic and treatment accommodation.

*Seminars on methods of investigating the working of health services* (20 hours):
- Objectives of health services
- Reasons for studying the working of health services
- Aspects that can be studied
- Methods of investigation
- Data for medical care research
- Examples of health service research

*Health education* (10 hours): Practical applications of the behavioural sciences; methods of health education and their evaluation.

Part 3. Class and individual projects; more advanced study in specialized fields

Class projects to illustrate the teaching in the first two terms.
Design of a project by each student individually under the supervision of a tutor.
Elective subject for special study. Examples:
(a) Health problems in developing countries
(b) Epidemiological research methods
(c) Operational research in the National Health Service.

Other courses

The London School of Hygiene and Tropical Medicine provides a wide variety of courses in subjects related to public health, occupational health, and tropical medicine and hygiene. Two of these are briefly described here.

The course in tropical public health is specifically designed to meet the requirements of doctors concerned with the development of health services in tropical areas. It is believed that there is only one other course of this kind in Europe (see sections on Belgium and the Netherlands). The School's Diploma in Tropical Public Health is recognized by a number of countries as equivalent to a Diploma in Public Health. The course includes:

_Tropical hygiene_
Epidemiology and control of communicable disease
Bacteriology and virology
Parasitology and entomology
Applied physiology and nutrition
Maternal and child health
Theory and practice of sanitation and provision of water supplies in urban, industrial and rural areas
Housing and town and country planning
International health work and agencies

_Medical statistics and epidemiology_
General principles of scientific method
Statistical treatment of problems of preventive medicine; design and practical conduct of epidemiological inquiries
Vital statistics and an introduction to demography

_Health services organization_
Social and cultural backgrounds and needs of communities; community development and organization
Health education
General principles of public health administration
Development of health services; static and mobile services; single disease and mass campaign projects
Evaluation of services; records and research in health services

_Dissertation_
A report on an approved individual inquiry into a subject concerned with public health in the tropics

_Visits_

The school also runs a 12-week course in medical services administration for medical graduates associated with the administration of medical services.
In exceptional cases, non-medical students may be accepted. The course includes:

**Introduction**
Theory and framework of public administration, influence of environment

**General principles of administration**
The administrative system: central and local government
Management of an organization
Economics and finance
Statistics: use of data, social and community measurement
Sociology, behavioural sciences

**The practice of medical and health service administration, as illustrated by national health services in Great Britain**
Government: central and local
The hospital services
The general medical services
Non-medical services relevant to health

**Research: development and evaluation**
Research in the natural sciences
Planning and development
Evaluation procedures
Operational and work study applied in health services

**International considerations**
International organizations
Medical and health services: comparison and contrast with selected countries

**Research**
For a number of years the public health departments (or their equivalent) of many medical schools and schools of public health have been devoting increasing time to research in public health, medical care practice, and various aspects of operational research as applied to health services generally. The special techniques of this type of research are beginning to be taught in the postgraduate curricula. Frequently postgraduate students undertake short-term studies of this nature as part of their course, e.g., studies of the work of health visitors (public health nurses) attached to general practices, of chiropody and the health service, and of health services in new housing estates.

The close link between the Medical Research Council's Social Medicine Research Unit and the London Hospital Medical School has already been mentioned.

In recent years the Department of Health and Social Security has itself taken an active part in research work dealing with the operation of the health services, and a special fund is available for this purpose.
YUGOSLAVIA

YUGOSLAVIA

Population (1963) 18 800 000

Yugoslavia is a federation of six people’s republics: Serbia, Croatia, Slovenia, Bosnia and Herzegovina, Macedonia, and Montenegro. Public health administration is decentralized, and every effort has been made to reduce the administrative apparatus to the minimum. The planning of health protection measures is also completely decentralized.

At neither federal nor republic level is there a ministry of health as such. The Federal Council (Parliament) appoints a Board of Health and Social Welfare from among its members, and there is a corresponding Federal Secretariat of Health and Social Affairs. The Secretariat has limited non-administrative functions mainly concerned with preparing laws, regulations, and general recommendations, running a federal inspectorate, and attending to international relations.

In some republics, the pattern of boards and secretariats of health extends down to commune level. In principle, there is no private practice in Yugoslavia, but doctors not employed by health centres may open private clinics. Doctors are employed directly by the institution in which they work, and are not State employees.

At republic and federal level, institutes of health provide technical advice and guidance, and special public health and hygiene services. They also give postgraduate teaching.

At commune level there are organized health units—public health centres—for 50 000–100 000 inhabitants. They are responsible to local health councils, and are the basic health institutions providing medical care services for the population of a defined area, including specialist services. Their departments of hygiene and epidemiology are responsible for public health services, and correspond roughly to the “sanepid” stations of other eastern European countries.

Urban districts, industries, mines, villages, or groups of villages have health sub-centres providing health protection for 3000–5000 inhabitants. The minimum staff of a sub-centre is a general practitioner, a nurse or midwife, and a health technician. This unit offers complete health protection to the local population, and is concerned with curative, preventive, and social aspects of health, applying “dispensary” methods of work. The objective is to provide care not only for the individual and his family but also for the community as a whole. In some cases the hospital service is incorporated into the health centre organization. Centres responsible for hospitals, polyclinics and a system of dispensaries are known as “medical centres.”
There is a system of social insurance for gainfully employed persons and a health insurance scheme for individual farmers. All health institutions are financed from the funds of these insurance bodies, not from the State budget, and are expected to be self-supporting. In 1963, 86% of the cost of the service was met from insurance funds.

Most hospitals are independent and self-supporting, and are the responsibility of the local health councils. They tend to fall into the familiar 3-tier pattern of central (teaching) hospitals, intermediate (district) hospitals, and small (commune) hospitals.

**Undergraduate medical studies**

There are eight medical schools in Yugoslavia, all incorporated within universities. They are autonomous institutions, and their teaching is financed from republic and commune funds. For research they usually depend on federal and republic research funds. They work in conformity with the provisions of the Act on the Universities, Statute of Universities and Faculties. Faculties are governed by Faculty Councils, Faculty Boards, and the Dean, an arrangement that parallels the organization of health services. Professors are elected by the Faculty Board and appointed by the Faculty Council.

Since faculties enjoy complete independence, the courses of study in Yugoslavia differ to some extent as regards the subjects taught and the time and methods used in teaching any particular subject. This point will be illustrated later.

The medical faculties aim to train public-health-minded general practitioners capable of coping with the social, preventive, and curative aspects of health and disease in their community. They aim to incorporate preventive and social aspects in all clinical teaching, although this is not always easy.

**Conditions of admission and duration of study**

At present, owing to the large number of applicants, Faculty Councils fix the number of students to be admitted each year. Candidates are admitted on the basis of their success at secondary school and an entrance examination. Medical education lasts five years, and there is no final State examination. After completing the course and passing all the examinations, the student receives the title of "physician". Before authorization to practise medicine is given, he must complete a one-year internship in a hospital or other health institution.

During the course, students must spend one month of a summer recess in a medical clinic, and one month in a surgical clinic.
Teaching of public health

The curriculum for public health, like other subjects, varies to some extent from school to school, although the basic elements of teaching are very similar. In all faculties, sociology is taught from the standpoint of materialistic philosophy and Marxist and Leninist ideas. This is intended to give the student an ideological basis to enable him to understand the role of medicine in a socialist society.

At Zagreb and some other faculties, a course of lectures is given in the first year of study as an "introduction to medicine". These lectures acquaint the student at the outset of his career with the basic concepts of health and disease and their dependence on ecological factors. They deal briefly with the principles of public health administration and with health institutions and health workers, including the concept of general practitioners as health and social workers. They also introduce the student to the principles and methods of the study of medicine and to medical ethics.

In teaching public health and hygiene, all medical faculties endeavour as far as possible to develop practical methods of work, such as laboratory practice, field visits, discussions, and seminars, and to reduce the number of didactic lectures to the minimum. Students in almost all faculties carry out field practice during the summer vacation or during term. At Zagreb, for instance, students spend one month in field practice after the third year of study. In small groups of four or five they go to remote rural areas where, under the supervision of a junior teacher, they carry out some modest task of health education, rural sanitation, baby care, or the like. The purpose of this is to bring the student into contact with the life of the people and their health and social problems. In the tenth semester the students work for two weeks in various health service sub-centres in the suburbs of Zagreb, side by side with the local general practitioners and public health nurses, and have an opportunity to learn something of the health and social problems of an urban population. A similar programme is organized at the faculty of Medicine in Belgrade. This type of activity compares with studies of "medicine outside the hospital" in the United Kingdom.

There can be considerable variation in the volume of practical work. In the epidemiology courses at three different schools, for example, the numbers of hours devoted to practical and theoretical work respectively are 30/30, 60/30, and 30/60.

In Yugoslavia subjects related to public health and hygiene are taught throughout the course from the first to the tenth semester (Table 27).

The examination in hygiene and social medicine is taken at the end of the tenth semester, whereas examinations in other public health subjects (statistical methods, introduction to medicine, sociology, microbiology) are taken at the end of the semester in which the subject is taught.
Hygiene. Students take the hygiene course in their fourth year. During the seventh semester they have two hours of lectures and two hours of practical work per week. In the eighth semester students work in small groups for 24 hours during one week.

Seminar methods are used as far as possible (an introductory lecture followed by discussion with the students), and the practical work is largely concerned with measurements, e.g., in water analysis, epidemiological surveys, food control, and other environmental factors. The main topics considered in the course at Zagreb are shown below:

Seventh semester

- Water and health: bacterial analysis of water; water supplies; chemical analysis, interpretation of results;
- Water purification: practical demonstration;
- Sewage disposal and purification;
- Physical factors in the working environment: measurements of noise, lighting, micro-climatic factors;
- Occupational injuries due to physical environment;
Epidemiology and its scope; epidemiological surveys;
Analysis of an epidemic;
Methods in epidemiology; seminar on cardiovascular disease;
Organization and planning of nutrition: composition of a menu in accordance with the caloric requirements of a population group;
Sanitary analysis of foodstuffs: milk analysis as an example of foodstuff analysis;
Nutrition and health.

Eighth semester

Vaccination: kinds of vaccines, vaccination calendar, techniques, practical work in a public health field institution;
Hospital infections;
Measurements of chemical factors in working environment;
Injuries due to chemical factors in working environment;
Workers' health protection (technical and medical);
Health principles in the disposal of human faeces, methods of disposal;
Housing and health;
Evaluation of the group training programme.

Social medicine. This course is given to fifth-year students and consists of 45 hours of lectures and 30 hours of practical classes, together with two weeks' full-time group training in the field.

The purpose of the course is to acquaint the student with modern methods of health protection in a community. These include an epidemiological and social approach to the socio-medical problems of a population, the methods of studying the population's health status, and the organization and operation of health protection and health-care services, including social and health insurance. The students also study a general practitioner service that is designed to offer continuous integrated health protection in relation to a population's total environment.

The group training in the tenth semester is carried out under the same conditions as the students will later encounter as general practitioners. Under the supervision of specialists in general medicine,1 students work at health centres (general practice units) in the consulting-rooms and laboratories, and make home calls. They also take part in social and health protection activities, public health nursing visits, and so on. Practical work takes up five hours a day. Giving the student independent work to do introduces him to the complexity of integrated health protection in practice.

This field course is more concerned with methods of conducting general practice than the rather similar general practitioner attachment schemes in some British schools, and is in this sense more of a vocational exercise. On the other hand, the Yugoslav health centre is more concerned with organized preventive and social medicine than its counterpart in the United Kingdom.

1 Normally holders of the Diploma in General Practice.
The main topics covered in the social medicine course at Zagreb are:

Ninth semester
Social medicine; its significance, development, future trends;
Health as a process of man's adaptation to a changing environment;
Disease as a clinical and social phenomenon; specific and multiple causes; epidemiological approach to the study of disease;
Methods of studying the health of a population;
Population structure and dynamics; recording causes of death; collection of knowledge about a population's health;
Economics and health;
Socio-medical aspects of rapid industrialization;
Health protection, methods of socio-medical protection;
Principles of the organization of health protection: integrated health protection; social responsibility; health services; solving health problems with the co-operation of the public; planning health protection services; management and finance; remuneration according to results obtained; free choice of physicians;
Health institutions, their tasks and scope;
Current problems of health protection in Yugoslavia;
Social and health insurance;
Health workers, their tasks and scope;
The general practitioner, his role and tasks in providing continuous integrated health protection;
Health education: principles and methods;
Physician-patient relationships: social and emotional aspects;
Health protection of mothers and infants, pre-school children and schoolchildren, young people;
Chronic and degenerative diseases (cardiovascular disease, cancer, tuberculosis, etc.):
preventive and socio-medical aspects;
Occupational accidents, traffic accidents, home accidents;
Health protection of the aged and the mentally or physically disabled;
Operational research in public health practice;
Ethical, professional, legal, and social responsibilities of health workers.

Tenth semester (field practice)
Basic demographic, socio-economic, and health conditions in the population served; deciding priorities, health problems in active health protection;
Role and tasks of the general practitioner and his team (nurse, sanitary technicians, etc.);
Organization of a health centre;
Recording and documentation: card index, referrals, recording, reporting;
Planning and remuneration of the general practitioner service;
Case work: clinical and socio-medical assessment of case; therapeutic measures; assessment of working capacity, documentation, system for regular summoning of patients;
Home visits;
Active health protection, health education, systematic examinations;
Public health nursing: at least three visits, accompanied by a public health nurse, to a tuberculosis patient, a child, and a chronically sick or other patient;
Equipment of a general practice unit: home-visit kit, emergency equipment, sterilization, drug storage;
Responsibilities of the physician: ethical problems, professional secrecy, certification;
Relationships and collaboration with governmental and other authorities, with members of the medical profession, and with social organizations.
Students are required to keep a working diary, in which they describe the work carried out; they must also give a written account of a socio-medical case or of a family’s health problems, containing the medical and socio-medical diagnosis, proposed medical and social treatment and rehabilitation, comments on the etiology, on prevention, and on the role of the physician in the solution of similar problems.

Statistics. The course in statistics follows the recommendations of a WHO Symposium, mentioned on page 27.

Mental hygiene. In Belgrade there is an interesting course covering the influence of mental factors on individual and collective pathology; defects and disorders of mental health from the socio-economic standpoint; the role of the doctor; prenatal care; pre-school age, puberty, and adulthood; the epidemiology of mental disease; the control of mental disease and preventive measures as regular tasks of the health services; drug addiction and alcoholism; measures for ensuring, developing, and maintaining a healthy personality; criticism of the abuse of mental hygiene; etc.

Postgraduate education

Physicians can receive four types of postgraduate training in hygiene and public health:

(1) Specialization
(2) Diploma in Public Health
(3) Higher degrees (master’s degrees, doctorates)
(4) Short courses.

The specialization of physicians in hygiene and other public health subjects is subject to the Regulations on the Specialization of Health Workers. Any physician, after working for two years in the field, may specialize in one of the following branches: hygiene; epidemiology; microbiology and parasitology; social medicine and public health organization; occupational medicine; and health statistics.

In addition, hygiene specialists may specialize further in community hygiene and environmental pathology, in food hygiene and dietetics, in school hygiene, or in the hygiene of transportation.

Specialist courses last three years, and further specialization takes one more year. Specialist training takes the form of in-service training at the high-level institutes of the health services and at university institutions. In some republics (Serbia, Croatia, Bosnia and Herzegovina) physicians

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1 WHO Regional Office for Europe (1963) The teaching of statistics to undergraduate medical students in Europe, Copenhagen (document Euro-207.1).
spend part of their training (usually one academic year) on organized courses at the “Andrija Štampar” School of Public Health, Zagreb, the Institute for Postgraduate Training of Health Workers, Belgrade, or the Medical Faculty, Sarajevo.

After completing the three-year training course, students have to take an oral and written examination. For some subjects, (e.g., social medicine and public health organization, occupational medicine) they must also submit to the examining committee a thesis based on their practical work.

Only the “Andrija Štampar” School of Public Health in Zagreb at present confers university diplomas and degrees in public health, occupational hygiene, etc. The School was originally founded in 1927, and is a university institution functioning within the Medical Faculty of the University of Zagreb. It is broadly comparable to the other special schools of public health in Europe, and in addition to its postgraduate activities is responsible for instructing undergraduates in all public health subjects.

The main courses at the School leading to a diploma and eventually a master’s degree are in public health, occupational health, and maternal and child health, all of two semesters’ duration. The School also runs a three-year “sandwich” course for a Diploma in General Practice, the curriculum for which includes a considerable amount of public health and social medicine; in addition to its theoretical content, there is a great deal of practical and in-service training.

The curriculum of the course for the Diploma in Public Health is as follows:

*Methods of research (30 hours)*

Principles of research work; the role of research under socialism; choice and definition of subject; methodology; approach to literature; organization and planning of work; teamwork in research; analysis of scientific data; publication of results; research in public health.

*Statistical methods and health statistics (70 hours)*

Methods: collection, analysis, and presentation of statistical data; measures of central tendency, dispersion, and association; simple significance tests; difference between means and proportions.

Health statistics: the role of health statistics in public health; statistical methods in epidemiology; sampling methods in health statistics; mortality and morbidity statistics; sources of statistics; organization of statistical services.

*Hygiene and social medicine (328 hours)*

Hygiene and social medicine in a socialist society; scope and methods; ecology: atmosphere, soil, water, food, occupation, housing, environmental sanitation, etc.; “sociosphere”; demography and vital statistics; economic development of Yugoslavia; education, town planning; personal hygiene; health of special groups: mothers and children, schoolchildren, workers, the aged, the physically, mentally, and socially handicapped; mental health and hygiene; public health administration; principles of organization of health services; legislation; health insurance; international public health; WHO and other agencies.
Epidemiology (170 hours)
Epidemiological methods; epidemiology of communicable disease, diagnosis and treatment of infectious disease; epidemiology of non-communicable disease: cardiovascular disease, cancer, traumatism, alcoholism, etc.; juvenile delinquency, prostitution.

Health education (30 hours)
Methods and techniques of health education; work with large and small groups; role of health education in public health; promotion of public health.

Field work (144 hours)
Methods of field work; environmental sanitation; health education; etc.

Foreign language (56 hours)
English, French, German, or Russian, according to the student’s choice.

The Institute for the Postgraduate Training of Health Workers in Belgrade conducts comprehensive teaching activities in both clinical medicine and the various fields of public health. It is therefore comparable with postgraduate institutes in other socialist countries. It was founded in 1959 as an independent extramural institution, but in its teaching activities it collaborates very closely with the Belgrade Medical Faculty. In public health subjects the Institute gives a number of long courses (equivalent to one academic year), short courses, and seminars for health workers. Some of these courses are summarized below:

Occupational health (2 semesters)
The programme forms part of the specialization programme in occupational health, and is also designed to enable industrial physicians to assume leading positions.

Course for physicians in hygiene and microbiology, with parasitology and epidemiology (2 semesters)
The programme, drawn up in accordance with the programmes of specialization in these subjects, is intended to prepare candidates for the specialist examinations and also to enable them to assume leading positions in the health services.

Social paediatrics for physicians (4 months)
The course covers antenatal and postnatal development, nutrition of expectant mothers, mental and physical preparation for delivery, infant metabolism, nursing and feeding, and common childhood ailments. The students also study the preventive programmes of child health institutions.

Mental hygiene and social psychiatry for general practitioners (2 months)
The course aims to provide physicians with a knowledge of mental hygiene and social psychiatry, to help them to approach these problems in their practices and research and to work independently in dispensaries and health centres.

Seminar on methodology of planning for heads of health centres (15 days)
This seminar aims to acquaint the participants with the most pressing problems encountered in organizing and operating health centres, planning health protection, and using statistical methods in the study of health conditions of populations and the elaboration of health protection programmes.
Seminar on social medicine and statistics for general practitioners (10 days)

This seminar covers the importance of socio-medical work in the health services, and the effects of disease on the economic development of the community. Participants also learn basic techniques in health statistics, and how to prepare statistical reports, plans, etc. The seminar is designed to fit in with the programme for specialization in general medicine.

Public health nursing for nurses (2 months)

Students are prepared for work as public health nurses, by means of lectures and practical demonstrations.

Seminar for sanitary technicians in industry (14 days)

The purpose of this seminar is to prepare sanitary technicians for work in occupational health stations in industry. Students are taught the fundamentals of work physiology, occupational diseases, industrial hygiene, safety in industry, and preventive medical work in general in the industrial milieu.

Higher degrees

To obtain a master’s degree in public health, physicians must complete the course for the Diploma in Public Health, and a thesis, which is examined by three university professors.

To obtain the degree of Doctor of Science in public health or an allied field, a candidate must apply to the Council of the Medical Faculty for permission to prepare a doctoral thesis, giving the title, the proposed content of the thesis, and the place of work. A thesis usually takes two or three years to prepare, and the candidate must then defend it before a special commission appointed by the Faculty Council.

Research

There is considerable interest in research on public health practice in Yugoslavia. Both the Central Institute of Public Health in Belgrade and the School of Public Health in Zagreb are collaborating (individually) in research work with workers in other countries and the World Health Organization. The Institute is involved in a study of medical care utilization in three different countries: the United Kingdom, the USA, and Yugoslavia. It also has a large research programme dealing with the development of public health practice in Yugoslavia.

The School at Zagreb is concerned in a study to compare the activities of two different types of health centre: those where curative and preventive medicine are fully integrated, and those where these two fields of activity are kept separate. Workers in Belgium and Israel are collaborating in this study. Other international and national research includes studies on the prevalence and early diagnosis of diabetes, and related socio-medical problems, epidemiological studies of schizophrenia and other mental disorders, and of cardiovascular diseases, and research on the physical growth of school-children and young people between the ages of 7 and 18 in Zagreb.
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